

SECTION 2

Affected Environment

The proposed improvement extends about **99 kilometers (61.6 miles)** from the planned Jacksonville West Bypass north to U.S. 136 near Macomb (Figure 1-1). Between Jacksonville and Beardstown, the study area is between U.S. 67 on the west and the Burlington Northern-Santa Fe (BNSF) railroad tracks on the east. North of the Illinois River to Macomb, the study area follows existing U.S. 67, except for Rushville and Industry bypasses. The project area was inventoried for environmental resources. Environmental features present in the study area are identified in this section and on the environmental inventory map (Figures 2-1, 2-2, and 2-3).

2.1 Social/ Economic

2.1.1 Demographics

2.1.1.1 Population

The project study area spans four counties (Morgan, Cass, Schuyler, and McDonough) and encompasses several communities. Between 1990 and 2000, the population of the four-county area declined 2.6 percent, from 92,856 to 90,413. Schuyler and McDonough counties posted population losses, while Morgan County and Cass County populations increased slightly. The State of Illinois posted growth of 8.6 percent for the same period (Table 2-1).

TABLE 2-1
County Population

	1990	2000	Percent Change 1990-2000
Morgan	36,397	36,616	+0.6
Cass	13,437	13,695	+1.9
Schuyler	7,658	7,189	-6.1
McDonough	35,364	32,913	-6.9
Illinois	11,430,602	12,419,293	+8.6

Source: U.S. Bureau of the Census 2000

There are five principal communities in the study area with a combined population of just over 47,500: Jacksonville, Beardstown, Rushville, Macomb, and Meredosia. Smaller communities include Concord, Bethel, Arenzville, Chapin, and Industry. Beardstown is the only community within the study area that increased in population from 1990 and 2000, posting a 9.4-percent population increase (Table 2-2).

TABLE 2-2
Community Populations

	1990	2000	Percent Change 1990-2000
Jacksonville	19,324	18,940	-2.0
Chapin	611	592	-3.1
Bethel	NA	NA	NA
Concord	201	176	-12.4
Arenzville	434	419	-3.5
Meredosia	1,134	1,041	-8.2
Beardstown	5,270	5,766	+9.4
Rushville	3,229	3,212	-0.5
Industry	632	540	-14.6
Macomb	19,952	18,558	-7.0

Source: U.S. Bureau of the Census 2000

NA = unincorporated community; data not available

2.1.1.2 Age

The four-county area has a greater percentage of population over the age of 65 than the overall state average (**16.2** percent versus **12.1** percent) (Table 2-3). In **2000**, **22.3** percent of the population was under the age of 18; **61.3** percent was between the ages of 18 and 64; and **16.2** percent of the population was over the age of 65. Similarly, the median age is higher in Morgan, Cass, and Schuyler counties compared to the statewide median age. In McDonough County, the median age is lower than the other three counties and lower than the overall median age for the state. This is attributable primarily to the large university population in Macomb.

TABLE 2-3
Age Distribution—2000

	Under 18 (%)	18 to 64 (%)	65 and older (%)	Median Age
Morgan	22.8	60.7	15.6	37.8
Cass	25.4	58.9	15.7	37.2
Schuyler	23.1	57.6	19.3	40.9
McDonough	17.7	68.1	14.2	29.0
Illinois	26.1	61.8	12.1	34.7

Source: U.S. Bureau of the Census **2000**

2.1.1.3 Education

Table 2-4 summarizes the educational characteristics of residents over 25 years of age in the four counties. All four counties compare favorably with Illinois in the percentage of high school graduates. In Morgan, Cass, and Schuyler counties, the percent of individuals with four-year college degrees is lower than the state figure of 13.6 percent. Generally, residents in McDonough County have achieved higher levels of education than residents in the other three counties. The percent of individuals with four-year college degrees in McDonough County is similar to the state average (13.1 percent compared to 13.6 percent) and the percent of individuals with advanced degrees exceeds the state average (10.6 compared to 7.5 percent). Again, this is attributable to the large university population in Macomb.

TABLE 2-4
Educational Characteristics of Persons 25 Years and Over

Education	Morgan Co.		Cass Co.		Schuyler Co.		McDonough Co.		Illinois
	No.	%	No.	%	No.	%	No.	%	%
Less than 9th grade	2,714	11.5	1,175	13.3	653	12.8	1,514	8.2	10.3
9th to 12th grade, no diploma	2,947	12.5	1,272	14.4	904	17.8	2,186	11.9	13.5
High school graduate	9,340	39.6	3,903	44.4	2,159	42.4	6,159	33.4	30.0
Some college, no degree	3,685	15.6	1,230	13.9	629	12.4	3,319	18.0	19.4
Associate degree	1,108	4.7	310	3.5	198	3.9	885	4.8	5.8
Bachelor's degree	2,448	10.4	652	7.4	407	8.0	2,415	13.1	13.6
Graduate or professional degree	1,336	5.7	283	3.2	140	2.8	1,946	10.6	7.5

Source: U.S. Bureau of the Census 1990

2.1.1.4 Housing

Residential areas are concentrated primarily in the communities, with rural residences (farmsteads) scattered throughout the project area. Residential areas are, for the most part, older single-family residences and mobile homes. Macomb, Jacksonville, and Rushville have all experienced some new residential development in the last 5 years. Rushville's growth has occurred south of U.S. 24 and west of U.S. 67 near Scripps Park.

In **2000**, approximately **67** percent of the housing units in the four-county area were owner-occupied, and **24** percent were renter-occupied. The remaining **9** percent of the units in the project area were vacant. The 1990 median value of owner-occupied housing units ranged from \$33,000 (Cass County) to \$47,600 (Morgan County) (Table 2-5).

Multi-family residences are most numerous in Jacksonville and Macomb, many of which are devoted to university and college populations. The smaller communities in the study area have a limited inventory of multi-family residential development.

Federally subsidized housing complexes exist in communities throughout the project area. There are seven facilities in Jacksonville, two in Meredosia, two in Beardstown, and one in Macomb, providing housing for low-income and elderly residents. Only one federally subsidized low-income housing development is located near U.S. 67. Riverside Apartments, a 50-unit complex in Beardstown, is near the junction of U.S. 67 and existing IL 125.

TABLE 2-5
Housing Characteristics

	Total Housing Units¹	No. Vacant¹	No. Owner-Occupied¹	No. Renter-Occupied¹	Median Value of Owner-Occupied Unit²
Morgan	15,291	1,252	9,877	4,162	\$47,600
Cass	5,784	437	4,007	1,340	\$33,000
Schuyler	3,304	329	2,345	630	\$36,300
McDonough	13,289	929	7,800	4,560	\$35,700

¹ Source: U.S. Bureau of the Census 2000

² Source: U.S. Bureau of the Census 1990

2.1.2 Environmental Justice

The Federal Highway Administration (FHWA) Order 6640.23 establishes policies and procedures to use in complying with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The project study area was evaluated in accordance with these procedures to determine if a potential exists for disproportionate and adverse impacts to low-income or minority populations.

The racial composition of the study area is predominantly Caucasian, accounting for over 93 percent of the population in the four-county area (Table 2-6). In 2000, African Americans accounted for 3.5 percent of the four-county population. Other racial groups (American Indian and Alaskan Native, Asian, Native Hawaiian and Other Pacific Islander, some other race, or two or more races) accounted for the remaining 3.1 percent of the population.

TABLE 2-6
2000 Racial Composition by County

Caucasian		African-American		Other*	
Number	%	Number	%	Number	%

TABLE 2-6
2000 Racial Composition by County

	Caucasian		African-American		Other*	
	Number	%	Number	%	Number	%
Morgan	33,811	92.3	1,961	5.4	844	2.3
Cass	13,000	94.9	61	0.5	634	4.6
Schuyler	7,103	98.8	16	0.2	70	1.0
McDonough	30,568	92.9	1,138	3.5	1,207	3.7
Total	84,482	93.4	3,176	3.5	2,755	3.1

Source: U.S. Bureau of the Census 2000

*Other: American Indian and Alaskan Native, Asian, Native Hawaiian and Other Pacific Islander, some other race, Two or more races.

Note: Persons of Hispanic origin are included within each race category.

Within the four-county area, the 2000 Census data indicates there are 2,185 people of Hispanic origin, representing 2.4 percent of the population in the four-county area. Over half of the residents of Hispanic origin are located in Cass County (Table 2-7).

TABLE 2-7
Hispanic Population, 2000

	Total Population	Hispanic or Latino (of any race)	Percent
Morgan	36,616	496	1.4%
Cass	13,695	1,162	8.5%
Schuyler	7,189	39	0.5%
McDonough	32,913	488	1.5%
Four-County Total	90,413	2,185	2.4%

Source: U.S. Bureau of the Census 2000

In 1990, the median household incomes in all four counties were below the overall statewide median household income of \$32,252. In Morgan County, the median household income was \$26,403, in Cass County it was \$23,642, in Schuyler County it was \$21,080, and in McDonough County it was \$21,774. Although the median household incomes in the study area are below the statewide median, it would be inaccurate to conclude that the area sustains widespread poverty. Many cost of living indices in the area are lower than other regions of the state. This is particularly notable for housing, local taxes, and general services. Therefore, less household income is required to sustain a modest **lifestyle** in the project area.

Recent Department of Health and Human Services (HHS) guidelines presented in the Federal Register, February 15, 2000, show that poverty thresholds for family sizes of three, four, five, or six persons are \$14,630, \$17,650, \$20,670, and \$23,690 respectively for the contiguous 48 states. Several assumptions have been applied to available data to determine the number of 1990 households that would fall below the published poverty level for the average family size in the study area. First, an average family size was calculated for each of the four counties in the study area, which ranges from 2.35 to 2.54. Based on this range, an average family size of three, or a poverty threshold of \$14,630, was selected for this analysis. Secondly, the 1990 income data was escalated to 2000 using an average annual increase in wages of 3.75 percent. The number of households (1990 data) that fall below the average poverty level threshold are shown in Table 2-8.

TABLE 2-8
Households Below the Poverty Level

	Morgan	Cass	Schuyler	McDonough
No. of Households	13,683	5,211	3,013	12,180
No. Below the Threshold	2,217	947	715	3,054
Percent Below the Threshold	16%	18%	24%	25%

TABLE 2-8
Households Below the Poverty Level

	Morgan	Cass	Schuyler	McDonough
--	---------------	-------------	-----------------	------------------

Source: U.S. Bureau of the Census 1990; escalated by CH2M HILL

The percent of households in the four-county area below the poverty threshold ranges from 16 to 25 percent. Further examination of the 1990 Census data show that no minority households in Cass or Schuyler counties are under the poverty threshold. In McDonough County, 24 percent of the Caucasian households are estimated to be below the poverty threshold, 44 percent of the African-American households fall below the threshold, and 63 percent of the Asian households are below the threshold. In Morgan County, the estimated percentages of households below the poverty threshold are 15 percent for Caucasian households, 48 percent for African-American households, and 0 percent for Asian households.

Demographic information for the study area provides no clear delineation of the distribution of minority or low-income groups. General observations of the area, however, suggest that minority and low-income groups are generally clustered in urban areas and scattered in rural areas. Empirically, the distribution of minority and low-income groups in rural areas is believed to be less than countywide demographic characteristics. Conversely, in urban areas it is speculated that percent of minority and low-income groups is slightly higher than countywide figures for minority and low-income groups.

2.1.3 Community Services/ Facilities

The study area is supported by infrastructure and community services including health care services, emergency services, churches and cemeteries, schools, and transportation facilities. Figures 2-1, 2-2, and 2-3 show locations of facilities within the project area.

2.1.3.1 Health Care

Three hospitals are within the project area: Passavant Hospital in Jacksonville; Culbertson Hospital in Rushville; and McDonough County Hospital in Macomb. About 14 nursing homes are in the communities within the project area; most are located within Jacksonville and Macomb. There are two nursing homes in Beardstown and one in Rushville. No hospitals or nursing home facilities are near any of the alternative corridors.

2.1.3.2 Emergency Services

Macomb and Jacksonville each operate their own fire services; the remainder of the study area is served either by fire protection districts (tax levying areas) or fire response territories (non-tax levying), all of which are staffed primarily by volunteers. There are seven fire districts or territories serving the study area: Industry Fire Protection District; Rushville Fire Response Territory; Beardstown Fire District; Meredosia Fire Protection

District; Arenzville Fire Response Territory; Concord Fire District; and Chapin Fire Response Territory. Figures 2-4 and 2-5 detail district boundaries.

Macomb, Rushville, Beardstown, Meredosia, Arenzville, and Jacksonville have their own police departments or police officers. Industry, Chapin, Concord, and Bethel rely on their respective county sheriff's departments for police protection.

2.1.3.3 Schools

Seven school districts serve the project area, as shown on Figures 2-6 and 2-7 and in Table 2-9. Alternative A passes in the vicinity of Triopia School, located on Arenzville-Concord Road, north of Concord. The school is about 1 kilometer (0.6 mile) west of the BNSF rail line. Industry High School is located on existing U.S. 67 on the southern edge of town. No other schools are near the alternative corridors.

TABLE 2-9
School District Information

District	Communities Served	No. of Schools	No. of Students	Students Per Teacher
Jacksonville District 117	Jacksonville, Murrayville	11	5,100	18
Triopia District 27	Arenzville, Concord, Chapin	2	510	17
Meredosia-Chambersburg District 11	Meredosia, Chambersburg	2	440	14
Beardstown District 15	Beardstown	5	1,380	16
Schuyler District 1	Rushville	4	1,230	14
Industry District 165	Industry	2	320	12
Macomb District 185	Macomb, Adair, Bardolph	4	2,650	16

Source: School District Data Book

2.1.3.4 Cemeteries and Churches

There are 14 cemeteries and three churches within the project area along the alternative corridors. Table 2-10 describes their approximate locations.

TABLE 2-10
Cemeteries and Churches

Name	General Location
Mt. Zion Cemetery	Mt. Zion Rd., north of U.S. 67
Mt. Zion Church	Mt. Zion Rd., north of U.S. 67
Chapin Cemetery	South side of U.S. 67, east of Arenzville-Concord Rd.
French Cemetery *	North side of U.S. 67, Chapin
Hodges Cemetery	East side of U.S. 67 at IL 100

TABLE 2-10
Cemeteries and Churches

Name	General Location
New Salem Cemetery	On IL 100, west of U.S. 67
Weeks Cemetery	Arenzville-Meredosia Rd., east of U.S. 67
St. Paul's Lutheran Cemetery	West side of U.S. 67, north of Honey Point Rd.
St. Peter's Lutheran Church	St. Peter's Lutheran Church Rd., west of BNSF tracks
St. Peter's Cemetery	St. Peter's Lutheran Church Rd., west of BNSF tracks
Hackman Cemetery	St. Peter's Lutheran Church Rd., west of BNSF tracks
Wagle (Todd) Cemetery	South side of Hagener Rd., west of BNSF tracks
Shuman Cemetery	West side of BNSF tracks, north of Hagener Rd.
Schneider Cemetery	South side of Stock Ln., east of Boulevard Rd.
Spaves Cemetery	Near Camden-Frederick Rd. (TR1200N)
Osborn Cemetery	West of Industry
Scotland Trinity Presbyterian Church	Northwest corner of U.S. 67 and Camp Creek Rd. (TR900N)

*** No graves at this cemetery.**

2.1.3.5 Transportation

Highways. U.S. 67 is the principle north-south highway serving western Illinois. Major east-west highways serving the project area include U.S. 24 and U.S. 136. Other state east-west routes in the project area include IL 100, IL 104, IL 125, and IL 101. All of these routes cross U.S. 67. Table 2-11 lists the functions and classifications of the project areas' major routes.

TABLE 2-11
U.S. and State Routes

Route	No. of Lanes	Function (within Illinois)
U.S. 67	2- and 4-lane	Originates near Alton, IL, and travels north to the Quad Cities.
U.S. 24	2-lane	Originates near Quincy, IL, and travels through Rushville; continues northwest through Peoria and to its terminus with I-69 in IN.
U.S. 136	2-lane	Originates and travels east through MO and IA and IL; travels through Macomb; and then west and south to its terminus with I-74 in IN.
IL 103	2-lane	Connects from U.S. 24 west of Beardstown to U.S. 67.
IL 100	2-lane	Originates in vicinity of Alton, IL and generally travels in a northerly direction to its terminus at IL 136 in the vicinity of Havana, IL. Is coterminous with U.S. 67 between Meredosia and Beardstown.
IL 104	2-lane	Originates in Quincy, IL and travels southeast to Taylorville. U.S. 67/IL 104 are on combined alignment between Meredosia and Jacksonville.

TABLE 2-11
U.S. and State Routes

Route	No. of Lanes	Function (within Illinois)
IL 125	2-lane	Connects Beardstown and Springfield.
IL 101	2-lane	Connects from IL 96 near the western state border east to its intersection with U.S. 67.

Rail. Two rail lines serve Macomb. Both are operated by the BNSF Railroad and provide both cargo and Amtrak passenger service. The tracks run from Chicago to Los Angeles and carry 24 to 26 freight trains daily. Freight generally consists of coal and general merchandise. Amtrak's "Illinois Zephyr" provides commuter service between Chicago and Quincy, IL (with service in Macomb). There are two daily trains (one in each direction) Monday through Saturday and one train (traveling from Quincy to Chicago) on Sunday. Amtrak services no other cities or communities in the project area.

BNSF rail lines formerly served Rushville; however, the route was eliminated and most of the track was removed years ago. BNSF operates a rail line that passes through Beardstown, Arenzville, Concord, and Jacksonville. The rail line originates in Galesburg and extends south to Metropolis, IL, and carries 16 to 18 trains daily. About 75 to 80 percent of the cargo transported is coal.

The Norfolk Southern Corporation has rail lines running between Bluffs and Meredosia before connecting with the main rail line, which connects Decatur, IL and Kansas City, MO. There are approximately 15 trains traveling through Meredosia daily. Primary products transported by rail include grain, granulated fertilizer, and potash.

Public Transportation. None of the communities within the study area have a public intracity transit (bus or rail) system. Both Jacksonville and Macomb have private taxi service, and Peoria Charter Coach (private bus company) provides intercity bus service between Macomb and Chicago.

Air Service. Within the project area, there are four public airports and four private air strips (Table 2-12). Two of the airports, Schuy-Rush Airport and Smith Field, are within close proximity to existing U.S. 67. Schuy-Rush Airport is just north of U.S. 24 on the west side of U.S. 67, and Smith Field is located on the west side of U.S. 67, just south of U.S. 136 (the project's terminus).

TABLE 2-12
Airports within the Project Vicinity

Airport/Strip	General Location	Comment
Macomb Municipal	North of Macomb	Public airport with two runways; 20,000 flights

TABLE 2-12
Airports within the Project Vicinity

Airport/Strip	General Location	Comment
Airport		annually; 40 percent are training or charter flights
Smith Field	Southwest corner of U.S. 67 and U.S. 136	Private airport with turf runway
Schuy-Rush Airport	West of U.S. 67, north of U.S. 24	Public airport with turf runway; 1,000 flights annually; 60 percent are training flights
Greater Beardstown Airport	East of BNSF tracks at Stock Ln.	Public airport with paved runway; 4,000 flights annually; 75 percent are training flights
Krohe Landing Strip	East of U.S. 67, south of Hagener Rd.	Private airport with turf runway
Kinsey Landing Strip	East of U.S. 67, north of Arenzville-Meredosia Rd.	Private airport with turf runway
Williams Field	South of U.S. 67, east of Chapin	Private airport with turf runway
Jacksonville Municipal Airport	North of Jacksonville	Public airport with two runways; 24,000 flights annually; 50 percent are training or charter flights

Source: Airport Master Records and Illinois Division of Aeronautics

Other Transport. The area from Beardstown to Naples on the Illinois River is an agri-business transportation center for west central Illinois. Water freight transport of bulk commodities is an important part of the transportation system in the project area (Table 2-13). Three of the six barge terminals in this stretch of the Illinois River account for over 11 percent of all of the state's grain shipments by barge, shipping over 2.6 million tons of grain and 1.3 million tons of other related products annually. Truck traffic uses U.S. 67 to reach these terminals to transfer shipments. Traffic on the Illinois water transportation system plays a key role in the state's export/import trade.

TABLE 2-13
River Terminals in the Project Area

Location	Terminal Owner
Beardstown	Continental Grain, Clarkson Grain Company, ADM-Growmark
Meredosia	Cargill Grain, Central Illinois Power Company, Illinois Road Contractors
Bluffs	Grain Terminal

2.1.4 Other Public Facilities

Other public facilities along the project corridor include the Morgan County Service (highway service facility) on U.S. 67 in Bethel and the Bainsbridge Township Office on U.S. 67 north of the Illinois River.

2.1.5 Economy

2.1.5.1 Economy and Labor Force Characteristics

U.S. 67 is an important north-south corridor in western Illinois that provides for the movement of goods and people. Four of the five economic centers in western Illinois are linked by U.S. 67's 400-kilometer (250-mile) path from Alton to the Quad Cities. These centers of Jacksonville, Macomb, Quincy, Alton, and the Quad Cities provide the economic engine to the region and serve the surrounding agricultural communities (Quincy is not directly on U.S. 67).

Jacksonville and Macomb are the principal economic centers within the project area, with Rushville and Beardstown also serving important roles. These centers feature economic bases that include manufacturing, food processing, retailing, business services, and medical services. These communities and others also support agri-business throughout the region, particularly river towns like Beardstown. The area from Beardstown to Naples on the Illinois River is an agri-business transportation center for all of central Illinois. Three of the six barge terminals account for over 11 percent of Illinois grain shipments by barge.

Jacksonville is the largest industrial/business center in the study area. Major employers in Jacksonville include Tenneco Packaging (formerly Mobil Chemical), Capitol Records/EMI, Passavant Memorial Hospital, Hertzberg-New Method, Illinois College, MacMurray College, and Morgan County (Table 1-1 in Section 1).

Macomb, located at the northern terminus of the study area, is the second largest economic center in the area. Western Illinois University in Macomb is by far the community's largest employer with almost 2,500 employees. There are 35 manufacturing companies in the Macomb area. Among the largest manufacturers are NTN-Bower, Western Industries, Cooper Power, and Haeger Pottery.

Outside of the larger communities of Jacksonville and Macomb, the economic activity is based largely on agri-business and food processing. Over 85 percent of the land area in the study area is used for agriculture. The principal farm products are corn, soybeans, and hogs. River barge, truck, and rail transport these products. Beardstown and Meredosia serve as transportation centers for agricultural products in west central Illinois. Beardstown is the third largest city in the study area and boasts one of the largest single employers in the area, Excel Corporation, with over 1,700 employees.

The economy of the area has been stable in recent years. Recent data show unemployment rates in the four-county study area generally declining from 1990 (Table 2-14). Unemployment rates for 1995 ranged from 2.6 percent in McDonough

TABLE 2-14
Annual Average Unemployment Rates

	1990	1995
Morgan	5.0	5.2
Cass	9.2	5.6
Schuyler	9.8	5.7
McDonough	4.6	2.6
Illinois	6.2	5.2

Source: U.S. Bureau of Labor Statistics

County to 5.7 percent in Schuyler County. In comparison, the state's annual average unemployment rate for the same period was 5.2 percent.

The work force for the four-county study area is shown in Table 2-15. Morgan and McDonough counties have the greatest work forces with 17,096 and 15,637 employees respectively.

TABLE 2-15
Work Force Distribution

Industry	Morgan County		Cass County		Schuyler County		McDonough County	
	No. of Employees	% of Workforce	No. of Employees	% of Workforce	No. of Employees	% of Workforce	No. of Employees	% of Workforce
Agriculture	925	5.4	604	10.1	548	17.0	774	5.0
Mining	26	0.2	29	0.5	30	0.9	101	.7
Construction	855	5.0	362	6.0	146	4.5	570	3.6
Manufacturing	3,126	18.3	1,076	17.9	411	12.8	2,202	14.1
Transportation and Utilities	927	5.4	593	9.9	257	8.0	667	4.3
Wholesale and Retail Trade	3,112	18.2	1,081	18.1	705	21.9	3,586	22.9
Finance, Insurance, and Real Estate	924	5.4	295	4.9	87	2.7	598	3.8
Services	6,015	35.2	1,544	25.7	876	27.2	6,665	42.6
Government	1,186	6.9	423	7.0	159	4.9	474	3.0
Total	17,096		6,007		3,219		15,637	

Source: U.S. Bureau of the Census 1990

Cass and Schuyler counties have work force totals of 6,007 and 3,219, respectively. The major employment categories are services, manufacturing, and wholesale and retail trade. In Morgan and McDonough counties, these employment categories account for over 70 percent of the labor force. The work force in these counties is highly mobile (Table 1-2 in Section 1). Approximately 4,000 people travel to Morgan County for employment from outside the county. A relatively high percentage of the employees who work in McDonough County also travel to work from outside the county.

2.1.5.2 Economic Development Resources

The communities in the study area have established programs to retain existing employers and attract new economic development. Three of the major communities (Jacksonville, Macomb, and Beardstown) in the project area have established enterprise zones with tax

abatement and credit programs that would benefit new and existing businesses. For example, the Macomb enterprise zone covers an area of 3.6 square kilometers (1.4 square miles), and has led to the creation and retention of almost 1,000 jobs. Beardstown also has an enterprise zone covering about 7.8 square kilometers (3 square miles), in which about 1,200 jobs have been created or retained. Jacksonville's enterprise zone also covers about 7.8 square kilometers (3 square miles).

Tax Increment Financing districts are also common in the study area, particularly in the downtown business districts.¹ Both the cities of Macomb and Beardstown have established Tax Increment Financing districts.

The larger communities, including Jacksonville, Beardstown, Rushville, and Macomb, have established industrial areas with the necessary infrastructure. At least two of the communities offer incentives and discounts on the cost of industrial property to prospective industries. Other financial incentives are also available to most business ventures such as revolving loan funds, **and** gap financing. Each community has a strong alliance between government and industry. In Jacksonville, at least five organizations have been established that focus on economic development. Business organizations are also present in Macomb, Rushville, and Beardstown. Overall, the economic organization and financial incentives available to attract and retain business in the area are well established.

2.1.6 Land Use

2.1.6.1 Existing Land Use

Agricultural land use represents more than 85 percent of the land use in the project area, with urban and other land cover representing the balance. Urban land uses are largely confined to the towns and cities located in the study area.

The communities of Jacksonville and Macomb, at the project termini, are expanding their boundaries, and existing agricultural uses at the edges of their cities are converting to urban land use (industrial, commercial, and residential subdivisions).

Rushville serves as a center for county government and health care services and its position as the county seat is an important feature in the vitality of the community. Rushville's primary business core is in its downtown area. Other commercial land uses are concentrated at the U.S. 67/U.S. 24 intersection. Industrial uses are generally located along the Bartlow Spur. Established residential neighborhoods ring the downtown area, and newer residential development is occurring west and south of the city. The county airport, Schuy-Rush Airport, is located on the west side of the community.

¹ Tax Increment Financing districts allow governing bodies to recapture the increment of increased value in property tax due to property improvements. This increment can then be used to finance infrastructure improvements and other incentives to bring redevelopment of the area.

Beardstown's land development is constrained by its location along the Illinois River and the presence of the Beardstown Marsh. Some businesses are located in the downtown core, but most of the commercial development is clustered at the U.S. 67/IL 125 intersection. Industrial development is located in the southeast portion of the community, along the BNSF railroad tracks. Excel Corporation is the largest employer in town.

Meredosia is not located directly on either of the project corridor alternatives, but has a significant number of industrial businesses that rely on the road system for access. The community is near IL 104 and the Illinois River, with industrial uses occurring primarily to the south and residential development occurring primarily to the north. The community's rail and port facilities provide important transportation links for farm to market product transport. Major employers in Meredosia include National Starch and Chemical Company and Central Illinois Public Service Company.

The remaining communities within the study area are predominantly residential. Convenience retail is available in each community; however, local area residents travel to other nearby communities in the area for primary services and retail. With the exception of Arenzville, the smaller communities do not have industrial enterprises. The Cass County Grain Elevator, Huey Forest Products, and Burrus Seed Company are all near Arenzville.

2.1.6.2 Planned Land Use

Land use planning policies vary throughout the study area. Macomb is the only community that has a formal comprehensive plan to guide future growth; most other communities have informal or unwritten policies about future development in the community.

Macomb has an adopted land use plan that includes lands in the vicinity of the project's north terminus. Its land use plan identifies commercial use along U.S. 136 near the project terminus.² Beyond the U.S. 136 corridor, lands are merely identified as "nonurban." The future use at U.S. 136 and U.S. 67 will most likely be commercial; future land uses south (in the vicinity of TR 219) will most likely remain agricultural.

Jacksonville does not have an adopted comprehensive land use plan. Development trends in the community include residential growth both north and south of Jacksonville, and industrial development occurring in their newest industrial park on the east side of town.

Rushville does not have an adopted comprehensive land use plan, but it has targeted industrial development for the areas north and west of U.S. 67 where the county owns land. The county and city have been working together aggressively to attract businesses and development to this area. New residential development has occurred south and west of the U.S. 67/U.S. 24 intersection in the vicinity of Scripps Park and golf course. The

² Macomb, Illinois Comprehensive Plan 1989.

State of Illinois recently selected Rushville as the location for a juvenile prison. This will be built on the west side of town on county-owned lands near the airport.

Beardstown does not have an adopted comprehensive land use plan, but has also targeted specific areas for development. New residential development is expected to expand to the east of the city, with commercial expected to grow around existing business cores, particularly around U.S. 67 and IL 125. The community's economic development leadership supports new industrial growth near its existing industrial area adjacent to the Beardstown Airport and the BNSF rail tracks, and has established an enterprise zone for this area.

Meredosia would not be directly affected by the proposed U.S. 67 improvements. Thus, future land use plans are not described in this document. The small communities (Chapin, Arenzville, Industry, Concord, and Bethel) do not have future land use plans, nor do they offer any insight regarding future development. These communities have experienced very little or no growth over the past decade. This is not expected to change. The factors that would affect future development in these communities are difficult to predict; therefore, no attempt will be made in this document to render opinions on future land use.

2.1.7 Parks

Recreation facilities within the project area include community and county parks. There are four parks in the project area that are either on existing U.S. 67 or within close proximity of the alternative alignment locations. All are city- or county-owned parks and are described in Table 2-16. In addition to city-owned parks, Weinburg-King State Park (310 hectares or 766 acres), owned and operated by the Illinois Department of Natural Resources (IDNR), is west of Rushville. The park has various hunting trails along with cross-country skiing, snowmobiling, hiking, horseback riding, fishing, picnicking, and camping. There are seven hunting clubs in the Muscooten Bay area northeast of Beardstown, one hunting club southwest of Beardstown, and four hunting clubs in the vicinity of Meredosia.

TABLE 2-16
Recreation Resources within the Project Area

City	Park Name	Location	Size of Park	Amenities
Rushville	Scripps Park	On U.S. 24; west of U.S. 67	51 hectares (126 acres)	9-hole golf course; swimming pool; 2 ball diamonds; 4 tennis courts. The park is being expanded to the west in order to provide an additional 9 holes at the golf course.
Rushville	Schuy-Rush Park	On U.S. 67; 4 kilometers (2.5 miles) south of Rushville	153 hectares (375 acres) *	86 campsites; canteen area with restrooms; fishing area; boat launch; ball diamond; playground; picnic pavilion areas

Arenzville	Community Park	In town, east of Arenzville Rd.	1 hectare (2.5 acres)	Picnic pavilion
Chapin	Chapin Park	On U.S. 67, 0.5 kilometer (0.3 mile) west of Oak St.	1 hectare (2.5 acres)	Ball diamond

* Park includes water area (91 hectares or 225 acres) and land area (60 hectares or 150 acres)

Schuy-Rush Park has the largest land area of the parks in the project area. The park is located on U.S. 61 about 4 kilometers (2.5 miles) south of Rushville. In the mid-1960s, the City of Rushville purchased the site to impound water. In an ordinance, the city set apart certain lands for recreation. The 153-hectare (375-acre) park includes a 91-hectare (225-acres reservoir, and 60 hectares (150 acres) of surrounding land. A recreational area, comprised of a boat launch, picnicking area, and camp ground, covers about 8 hectares (20 acres). The remaining properties are undeveloped. Casual or dispersed recreational uses rarely occur outside the developed recreational area. See Appendix E for additional details and an exhibit of the park boundary.

2.2 Agricultural Resources

Farming is the major enterprise for the four-county area and is a vital part of its economy. Based on the 1999 Illinois Agricultural Statistics and the 1997 Census of Agriculture—the most current statistics—the combined agricultural lands account for 84 percent of the four-county land use. This translates to 424,818 hectares (1,049,745 acres) of land devoted to farm activities. The four counties represent about 4 percent of the state's entire amount of farmland. The average farm size for the four-county area is 173 hectares (427 acres).

Nearly 75 percent of lands farmed in the four-county area are comprised of prime or important soils. As defined by the U.S. Department of Agriculture (USDA), prime farmland is land that is best suited to food, feed, forage, fiber, and oilseed crops. Prime farmland produces the highest yields with minimal expenditure of energy or economic resources, and farming it results in the least damage to the environment (Natural Resource Conservation Service [NRCS] 1995).

The soils and topography throughout most of the corridor range from good to ideal for an agricultural environment. Most of the area's natural drainage is toward to the Illinois River, with the low-lying areas subject to frequent brief flooding. Two glacial advances contributed a variety of soil materials to the area. Upland soils were formed mainly by silty windblown loess, while terraced areas were formed in sandy and loamy material. A number of major soil conservation concerns exist for the region, including erosion, soil blowing, wetness, fertility, and tilth. The Conservation Reserve Program (CRP) was established to prevent the loss of important agricultural soils through erosion. Farmers in the project area are eligible to participate in the program. Table 2-17 provides county and state agricultural statistics.

Principal crops grown in the project area are corn and soybeans. Specialty crops, such as melons and pumpkins, are also grown in Cass County. The four-county area produces about 4 percent of the state's corn and soybeans. Livestock production is also important in the four-county area. Pork production is centered primarily in the northwestern and western counties of the state. Cass County is consistently in the top ten leading counties in the state in hog inventory, and Morgan County is ranked in the top ten counties in the state for beef cow inventory. See Table 2-18 for a breakdown of the cash receipts for the four counties compared to the State of Illinois statistics.

TABLE 2-17
Agricultural Lands

	Morgan Co.	Cass Co.	Schuyler Co.	McDonough Co.	Illinois
Total Land Area of County—ha (ac)	146,853 (362,881)	98,420 (243,200)	112,405 (277,758)	150,737 (372,478)	14,398,644 (35,579,712)
Total Land in Farms	123,666 (305,585)	78,977 (192,156)	84,553 (208,935)	137,622 (340,071)	11,009,420 (27,204,780)
Percent of Total Land Area	84%	80%	75%	91%	76%
Percent Designated "Prime" Farmland	71%	62%	73%	82%	
Number of Farms	780	417	477	824	73,051
Average Farm Size— ha (ac)	159 (392)	187 (461)	177 (438)	167 (413)	151 (372)
Average Farm Value	\$594,822	\$686,093	\$312,573	\$532,846	\$539,181

Source: 1999 Illinois Agricultural Statistics Annual Summary; Census of Agriculture 1997

TABLE 2-18
Cash Crop Receipts, 1998 (thousand dollars)

	Morgan Co.	Cass Co.	Schuyler Co.	McDonough Co.	Illinois
Corn	\$35,599	\$20,781	\$14,027	\$38,984	\$2,922,327
Soybeans	\$32,938	\$16,258	\$13,746	\$36,031	\$2,643,530
Wheat	\$1,431	\$867	\$1,232	\$363	\$147,525
Other Crops	\$1,230	\$1,493	\$1,098	\$2,472	\$453,639
Total Crop	\$71,198	\$39,399	\$30,103	\$77,850	\$6,167,021
Livestock	\$15,868	\$26,263	\$7,238	\$13,359	\$1,575,259
Total Receipts	\$87,066	\$65,622	\$37,341	\$91,209	\$7,742,280

Source: 1999 Illinois Agricultural Statistics Annual Summary

The production of crops and other agricultural commodities plays an important role in the study area's economy. According to the 1990 Census, 2,851 people in Morgan, Cass, Schuyler, and McDonough counties were employed in agriculture, which represents 6.8 percent of the work force (Table 2-15). Employment related to farming includes the transportation of agricultural commodities, sale of agricultural machinery, and production chemicals. Agri-businesses in the project area include grain elevators (both rail and river terminals), fertilizer companies, meat processing companies, and other food processing related businesses.

2.3 Natural Resources

2.3.1 Geology and Soils

Both geology and soils play an important role in the economics and feasibility of road construction. Roads built in locations having favorable geology and soil conditions are typically less expensive to build and result in less long-term maintenance problems. In contrast, roads located in geological and soil conditions that exhibit stability and drainage problems or surface bedrock conditions are typically more expensive to construct and may pose long-term maintenance and safety problems. The information in this section addresses known bedrock geology, surface geology, topography, soils, economic geology, and groundwater.

2.3.1.1 Bedrock Geology

There are four principal uppermost bedrock units found throughout the project area: Warsaw shale, Keokuk limestone, Tradewater formation, and Carbondale formation. Each formation is overlain by surface geology of sufficient depth that none of the bedrock units would be encountered during road construction. The areas in which this bedrock is found and general geologic properties are described in Table 2-19.

TABLE 2-19
Bedrock Material in the Project Area

Location	Bedrock Unit Types	Properties
Vicinity of Macomb	Mississippian-age Warsaw shale	Gray shale containing beds of aggrillaceous limestone.
Macomb to Industry	Pennsylvanian-age Tradewater Formation	Primarily siltstones and shales, but also contains some thin limestones, sandstones, and coals.
Industry to Rushville	Pennsylvanian-age Carbondale Formation	Dominated by gray shales, but also contains several limestone and sandstone members, and the principal coals of economic importance in Illinois: the Herrin (No. 6), the Springfield-Harrisburg (No. 5), the Colchester (No. 2), and the Danville (No.7) coal members. The stratigraphic facies of a complete section of the Carbondale Formation consists of cyclical sequences of sandstone-shale-coal-black shale-limestone.
Rushville to Illinois River Valley	Tradewater Formation	See above for description of Tradewater Formation.
Illinois River valley	Warsaw Shale and Mississippian-age Keokuk limestone	The Warsaw Shale is described above; Keokuk limestone consists predominantly of gray, white, or buff cherty limestone; the upper part of the formation is dolomitic.
East side of the Illinois River valley	Tradewater formation	See above for description of Tradewater Formation.
Illinois River valley to Jacksonville	Carbondale Formation	Carbondale formation is described above.

2.3.1.2 Surface Geology

The bedrock throughout the study area is overlain by glacial till materials that were deposited by the Lake Michigan Lobe of the Illinoian advance. The study area is within the Illinois Till Plain, and is classified as the Springfield Plain south of the Illinois River (in Cass and Morgan counties), and as the Galesburg Plain north of the Illinois River (in Schuyler and McDonough counties). Lands south of the river are composed of Illinoian Till, and north of the river are composed of Hulick Till; both are of the Glasford Formation.³ Both formations are best described as hard packed sandy, gravelly till. Alluvial sediments, classified as Cahokia Alluvium, are found in the floodplains and channels of rivers and streams. These deposits contain a mixture of sand, gravel, silt, and clay materials.

³ Glasford Formation consists of loamy and sandy or silty and clayey deposits of the Pleistocene Series.

Within the study area, loess is almost universally encountered across the uplands. Through the entire study area, the average depth of loess ranges from 3 to 5 meters (10 to 16 feet); total thickness is generally greater close to the Illinois River. These silty loess materials were deposited by wind action, the silts having been picked up from the Illinois River valley and deposited across the countryside. The loess includes both the Peoria loess and the underlying Roxana Silt. These deposits were primarily deposited during the latter stages of the Wisconsin Glaciation.

There are two significant bluff areas within the project area: an area just north of the Illinois River; and an area south of the Illinois River near Arenzville. The thickness of loess in both of these bluff areas is as great as 35 meters (115 feet). The deposits north of the river generally consist of Cahokia Alluvium, underlain by Henry Formation, a well sorted sand and gravel deposit of the Pleistocene Series. The deposits south of the river consist of Pleistocene-age Cahokia Alluvium, Equality Formation, Grayslake Peat, or Parkland Sand and underlain by the Henry Formation.^{4,5,6}

2.3.1.3 Topography

The topography in the project corridor includes level to gently rolling uplands, deeply dissected uplands closer to the Illinois River bluff, steep bluff areas adjacent to the river valley, and the level, wide floodplain of the Illinois River. Elevations range from 210 meters (690 feet) mean sea level (MSL) north of the river to 131 meters (430 feet) MSL in the Illinois River valley. The tributary streams throughout the project area are deeply incised and have steep valley walls.

2.3.1.4 Soils

Six major soil profiles occur within the project corridor. Two are associated with the uplands, one with bluffs adjacent to the Illinois River valley, and three with the river valley bottoms.

Upland soil profiles in the project corridor include the Ipava-Tama-Sable and Hickory-Rozetta-Elco associations. The Ipava-Tama-Sable Association consists of nearly level to moderately sloping soils that are poorly to moderately well drained. These soils are used mainly for cultivated crops grown in the area, such as corn and soybeans. Erosion is a hazard in the gently sloping and moderately sloping areas, and wetness is a limitation in the nearly level areas. The Hickory-Rozetta-Elco Association consists of gently sloping to very steep soils that are moderately well to well drained, formed in loess or glacial till. This soil type is also used for cultivated crops, as well as pasture or woodland. Erosion and soil stability is a problem with the soils in this association.

⁴ Equality Formation consists largely of quiet water lake sediments dominated by silt and clay.

⁵ Grayslake Peat consists of organic peat, muck, and marl interbedded with silt and clay.

⁶ Parkland sand consists of windblown deposits of well-sorted, medium-grained sand.

The bluffs area soil profiles consist of the Fayette-Sylvan-Bold Association. This association consists of gently sloping to steep soils that are well drained, formed in loess. The Fayette and Sylvan soils are well suited for woodlands. Erosion and soil stability is a problem with the soils in this association.

The river valley bottoms soil profiles include the Worthen-Littleton Association, Bloomfield-Plainfield-Alvin Association, and the Plainfield-Sparta Association. The Worthen-Littleton Association consists of nearly level to moderately sloping soils that are on foot slopes and alluvial fans and is well drained and somewhat poorly drained. This association is well suited to cultivated crops. The Bloomfield-Plainfield-Alvin Association consists of soils that are gently sloping to steep, excessively well-drained, sandy and loamy soils that formed in wind-deposited sandy and loamy material. In the less sloping areas the soils in this association are used mainly for cultivated crops, but in the more sloping areas they are used for woodland or pastureland. The Plainfield-Sparta Association consists of gently sloping to strongly sloping, excessively drained, sandy soils that formed in wind- and water-deposited sands. The soils in this association are used mainly for cultivated crops, and in some areas, woodlands.

Along the project corridor, the NRCS has classified 19 soil types as hydric (wetland soils). These hydric soils are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions. They are commonly sufficiently wet to support the growth and regeneration of hydrophytic vegetation, resulting in wetland formation. The majority of hydric soils are found south of the Illinois River, in Cass and Morgan counties (13 of 19 of the hydric soils identified).

South of the Town of Beardstown, in and around the Beardstown Marsh Natural Area, peat bodies are depicted on the IDNR map, “Quaternary Deposits of Illinois” (Figure 2-1). These peat areas are primarily associated with the abandoned channel of the Illinois River and consist of poorly drained, moderately permeable, organic deposits on floodplains. Groundwater discharge in these areas is common during high water events in the Illinois River. The peat bodies are commonly associated with many shallow water areas, represent excellent habitat for wetland wildlife, and are often good wetland mitigation sites. Peat bodies are generally not suited for highway construction, cultivated crops, or to use as sites for dwellings and septic tank absorption fields because of ponding and flooding.

Soils that have slope of 5 to 10 percent, or higher, are considered to be highly erodible lands. About 191 hectares (472 acres) of highly erodible lands occur within the project area. Areas of highly erodible lands are mainly confined to upland areas, particularly in association with bluff areas north of the Illinois River and south of the Illinois River near Arenzville. These erodible lands are generally located within three major soil profiles that were previously discussed; Ipava-Tama-Sable, Hickory-Rozetta-Elco, and Fayette-Sylvan-Bold associations. Of the total 191 hectares (472 acres) of highly erodible lands, 86 hectares (213 acres) are located in Morgan County, 69 hectares (170 acres) in Schuyler

County, 32 hectares (79 acres) in McDonough County, and 4 hectares (10 acres) in Cass County.

2.3.1.5 Economic Geology

Mineral resources in the project study area include coal, clay, limestone, gravel, sand, stone, crude oil, and natural gas.

Although no active coal mines are present near the study area, the area has a history of coal mining. According to Illinois State Geological Survey (ISGS) Coal Mine records, Schuyler County had several operating underground mines in the past, whereas no underground or surface coal mines have been recorded for McDonough and Cass counties. Records indicate that portions of existing U.S. 67 may have been undermined; however, the extent of the undermining is uncertain. According to the 1989 Coal Mine Map, two mine shafts (the Finch/Sugar Creek/Hines/Buss mine and the Eddington mine) are located about 2.1 and 2.4 kilometers (1.3 and 1.5 miles) south of the McDonough-Schuyler county line, and about 0.4 kilometer (0.2 mile) east of existing U.S. 67. In Morgan County, part of the project area has been subjected to surface and **possibly** underground mining. According to the 1989 Coal Mine Map, four mines may be located near **the** existing U.S. 67 in the vicinity of Dutch Lane.

There are three petroleum pipelines within the project area: special waste Sites 8 (Amoco Oil Co.), 26 (Williams Pipeline), and 32 (Williams Pipeline). The Site 8 pipeline crosses existing U.S. 67 right-of-way north of Rushville near Moore Road. The Site 26 pipeline is located north of Arenzville along the BNSF Railroad. The Site 32 pipeline crosses existing U.S. 67 right-of-way south of Beardstown between Willow Creek and Coon Run. There are also four aboveground storage tank (AST) batteries located within the project area: special waste Sites 16 (Midland Minerals), 17 (Precision Production), 19 (Pfieffer Est.), and 20 (Pfieffer Est.). All of the ASTs are in the Rushville area.

2.3.1.6 Groundwater

In McDonough County, water is found in sandstone and limestone aquifers at depths ranging from 38 to 137 meters (125 to 450 feet). In Schuyler County, water is obtained from aquifers of unconsolidated surficial deposits, sandstone, and limestone at depths of 6 to 119 meters (20 to 390 feet). In Cass and Morgan counties, water is obtained from aquifers of unconsolidated sand and gravel deposits at depths ranging from 2 to 30 meters (7 to 100 feet) and 9 to 23 meters (30 to 75 feet), respectively.

Four municipalities within the U.S. 67 project area use groundwater wells to supply drinking water: Arenzville, Beardstown, Rushville, and Industry. The City of Arenzville obtains its water from two wells located west of town, approximately 26 kilometers (16 miles) north of U.S. 67. The wells are each 18 meters (59 feet) deep. The City of Beardstown obtains its water from four wells located on the western edge of the city, approximately 3.2 kilometers (2 miles) east of existing U.S. 67. The wells are each 26 meters (85 feet) deep. The City of Rushville obtains its water from three wells located to

the south near the Illinois River bridge in Beardstown, approximately 4.8 kilometers (3 miles) west of existing U.S. 67. The wells are each 18 meters (59 feet) deep. The City of Industry obtains its water from two wells located west of town, approximately 3.2 kilometers (2 miles) south and west of existing U.S. 67. The wells are 137 meters (450 feet) and 116 meters (380 feet) deep. The cities of Jacksonville and Macomb use surface water resources to supply drinking water (Section 2.3.2, *Surface Water Resources/Water Quality*).

The ISGS has recorded 29 private groundwater wells within 61 meters (200 feet) of the proposed right-of-way. The wells in the area are primarily shallow wells.

The potential for groundwater contamination varies by county and is related to the permeability of the underlying geologic materials. ISGS, in its Preliminary Environmental Site Assessment (PESA), reported potential for groundwater contamination in the project area counties. This is detailed in Table 2-20. Aquifers are best protected from contamination where uniform, relatively impermeable, silty, or clayey tills greater than 6 meters (20 feet) cover impermeable bedrock. Intermediate potential for contamination of aquifers occurs where permeable bedrock is within 6 meters (20 feet) of the surface and is overlain by impermeable till. Higher potential contamination of aquifers occurs where surficial deposits are alluvium. All of these conditions are estimated to occur throughout the four-county area. There are no sole-source aquifers as defined by Section 1424 (E) of the Safe Drinking Water Act located within the project area **(April 24, 2002 [USEPA 1999])**.

TABLE 2-20
Zones for Potential Groundwater Contamination

Zone	County			
	McDonough	Schuyler	Cass	Morgan
	E, F	A4, F, G ,AX	A2, AX	AX, A1 ,F, C2, E, G, AX

Source: PESA

A1: Permeable bedrock within 6 m of land surface with variable overlying materials

A2: Thick, permeable sand and gravel within 6 m of the surface, and alluvium

A4: Cemented sandstone within 6 m of land surface with variable, relatively impermeable overlying materials

AX: Alluvium, a mixture of gravel, sand, silt, and clay along streams, variable in composition and thickness

C2: Sand and gravel within 6 to 15 m of the surface, overlain and underlain by relatively impermeable till, and other fine-grained materials, and/or bedrock

E: Uniform, relatively impermeable silty or clayey till at least 15-m thick with no evidence of interbedded sand and gravel

F: Relatively impermeable bedrock within 6 m of the surface, mostly overlain by till or other fine-grained materials

G: Relatively impermeable bedrock within 6 to 15 m of the surface, overlain by till or other fine-grained materials

2.3.2 Surface Water Resources/Water Quality

The proposed project is located within three drainage basins: the La Moine River, the Central Illinois River, and the Lower Illinois River. A total of 26 streams, two lakes, and 137 wetlands occur within the project corridor (wetlands are discussed below in Section 2.3.3, *Wetlands*). Major water bodies within the project area are shown on Figures 2-1, 2-2, and 2-3. Sixteen water bodies of primary concern are present in Schuyler and McDonough counties: five perennial drainages, nine intermittent drainages, and two perennial lakes (Table 2-21). Eight of these water bodies are located within the La Moine River drainage basin, and eight are located within the Central Illinois River drainage basin.

Twelve water bodies of primary concern are present in Cass and Morgan counties: five perennial drainages and seven intermittent drainages (Table 2-21). All 12 water bodies are within the Lower Illinois River drainage basin.

Several impoundments and small ponds and ditches are also present within the corridor. The ponds, generally under 2 hectares (5 acres) in size, are used for livestock watering, irrigation, or ornamental purposes. Many are formed by the impoundment of surface water runoff within a drainage. The ponds can provide a source of water for wildlife and many provide habitat for migrating waterfowl. Some of these ponds are stocked with fish such as bass and bluegill, and may provide recreational fishing opportunities.

Riparian and in-stream habitat quality varied significantly among water bodies within the project corridor. Habitat quality was generally highest for streams located above the floodplain of the Illinois River as row-crop agriculture was either non-existent or minimal because of steeper terrain. The highest quality streams were generally those on the sand and bedrock bluffs north/west of the Illinois River in McDonough and Schuyler counties.

Two municipalities within the U.S. 67 project area use surface water resources to supply drinking water: Jacksonville and Macomb. The City of Jacksonville obtains its water primarily from the Illinois River near the Town of Naples, approximately 42 kilometers (26 miles) west of Jacksonville. The City of Macomb obtains its water from Spring Lake, located approximately 6.4 kilometers (4 miles) northwest of the city. The cities of Arenzville, Beardstown, Rushville, and Industry use groundwater wells to supply drinking water (Section 2.3.1.6, *Groundwater*).

TABLE 2-21
Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	County	Drainage Basin ^a	Upstream Watershed Area km ² (mi ²) ^b	Flow Characteristics ^c	NWI Classification ^d
North/West of Illinois River					
Troublesome Creek	McDonough	La Moine River	30.3 (11.7)	Perennial	R4SBF
Camp Creek	McDonough	La Moine River	111.3 (43.0)	Perennial	NA
Grindstone Creek	McDonough	La Moine River	31.4 (12.1)	Perennial	NA
Carter Creek	McDonough	La Moine River	NA	Intermittent	NA
Stony Branch	Schuyler	La Moine River	1.0 (0.4)	Intermittent	NA
Ryan Branch	Schuyler	La Moine River	2.9 (1.1)	Intermittent	NA
Horney Branch	Schuyler	La Moine River	6.2 (2.4)	Intermittent	R2UBH
Town Branch	Schuyler	La Moine River	3.0 (1.2)	Intermittent	R4SBF
W. Branch Sugar Creek	Schuyler	Central Illinois River	18.8 (7.3)	Perennial	NA
Boeur Branch	Schuyler	Central Illinois River	0.4 (0.1)	Intermittent	NA
E. Fork Crane Creek	Schuyler	Central Illinois River	17.2 (6.6)	Intermittent	R2UBH
Bluff Ditch	Schuyler	Central Illinois River	11.0 (4.3)	Intermittent	R2UBHx
Coal Creek Ditch	Schuyler	Central Illinois River	1.2 (0.5)	Intermittent	R2UBHx
Illinois River ^e	Schuyler	Central Illinois River	28,360 (10,950)	Perennial	L1UBHh
Schuy-Rush Lake ^f	Schuyler	Central Illinois River	34.3 (13.3)	Perennial	L1UBHh
Curry Lake (York)	Schuyler	Central Illinois River	NA	Perennial	L2UBGh
S. Beardstown Ditch	Cass	Lower Illinois River	NA	Intermittent	R2UBHx
Indian Creek	Cass	Lower Illinois River	647.5 (250.0)	Perennial	R2UBHx
Clear Creek	Cass	Lower Illinois River	72.7 (28.1)	Perennial	R2UBHx
Prairie Creek	Cass	Lower Illinois River	60.3 (23.3)	Intermittent	R2UBH
Mud Creek	Cass	Lower Illinois River	NA	Perennial	R2UBH
Tributary to Mud Creek	Morgan	Lower Illinois River	NA	Intermittent	NA
Coon Run Creek	Morgan	Lower Illinois River	61.9 (23.9)	Perennial	R2UBH
Willow Creek	Morgan	Lower Illinois River	15.5 (6.0)	Intermittent	R2UBHx

TABLE 2-21
Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	County	Drainage Basin ^a	Upstream Watershed Area km ² (mi ²) ^b	Flow Characteristics ^c	NWI Classification ^d
Spring Run Creek	Morgan	Lower Illinois River	NA	Intermittent	R2UBH
Lick Branch	Morgan	Lower Illinois River	NA	Intermittent	NA
Mauvaise Terre Creek	Morgan	Lower Illinois River	312.1 (120.5)	Perennial	NA
Tributary to Mauvaise Terre Creek	Morgan	Lower Illinois River	NA	Intermittent	NA

^a USGS 1974

^b Calculated from USGS Maps (1:24,000)

^c Determined from USGS Maps (1:24,000)

^d Wetland Data from National Wetland Inventory maps (see Appendix J for more detailed description of **classifications**)

^e Navigable waterway (INHS, October 7, 1993)

^f IEPA designation: "significant public water" (INHS, October 7, 1993)

NA: not available

R4: Intermittent Riverine
R2: Lower Perennial Riverine
L1: Limnetic Lacustrine
L2: Littoral Lacustrine

2.3.2.1 Physical and Biological Description of Surface Water Bodies

The Biological Stream Characterization (BSC) is an Illinois stream classification system developed by the BSC Work Group, composed of biologists from the Illinois Environmental Protection Agency (IEPA), IDNR, and the Illinois Natural History Survey (INHS). The BSC Work Group developed a five-tier stream classification system based on benthos, fish, and stream habitat: A—Unique Aquatic Resource, B—Highly Valued Resource, C—Moderate Aquatic Resource, D—Limited Aquatic Resource, and E—Restricted Aquatic Resource. Five water bodies within the project area were evaluated using the BSC classification system. Two creeks were classified as highly valued aquatic resources (Grindstone Creek and Indian Creek), and three creeks were classified as moderate aquatic resources (Troublesome Creek, Camp Creek, and Clear Creek).

Surface water resources within the project area were field surveyed and assigned a habitat quality score. Habitat quality scores are based on 12 physical parameters, including stream substrate, canopy cover, deposition, and bank stability. The maximum total score for overall habitat quality was 180. Resources receiving more than 150 points are classified as excellent condition, 120 to 149 as good condition, 100 to 119 as fair condition, and less than 100 as poor condition. Four streams/creeks within the project area were classified as good habitat quality (Horney Branch, West Branch of Sugar Creek, Spring Run Creek, and East Fork of Crane Creek), two creeks were classified as fair quality habitat (Mauvaise Terre Creek and Coon Run), and the rest of the water bodies were classified as poor quality habitat.

None of the water bodies receiving good or fair habitat quality scores were evaluated using the BSC classification system. However, the streams with BSC designation as highly valued or moderate aquatic resources were classified as poor quality habitat during field surveys. The discrepancy between the two methods for assessing the biological condition

of the stream may be due largely to issues of scale. The BSC characterization evaluates the stream from its headwaters to its terminus, while the habitat quality scores were assigned for only the reach of stream located within the project area.

The physical and biological characteristics of water resources located within the study corridor are presented in Table 2-22, including surrounding land use, riparian vegetation, stream substrate, depth, and width, and habitat quality scores.

Forty-eight species of fish representing 12 families were collected at stream sites located within the project area (Table 2-22). Common fish species in the watershed were red shiner (*Cyprinella lutrensis*), bigmouth shiner (*Notropis dorsalis*), bluntnose minnow (*Pimephales notatus*), creek chub (*Semotilus atromaculatus*), green sunfish (*Lepomis cyanellus*), and bluegill (*Lepomis macrochirus*). There was a relatively diverse fish population within the project corridor. Most of these fish species are generally tolerant of degraded water quality conditions. However, fish (mainly darter species) that are intolerant and intermediately tolerant of degraded water quality conditions were found in Horney Branch, West Branch of Sugar Creek, Grindstone Creek, and Carter Creek. Seventeen freshwater mussel species representing four families were collected during the INHS surveys of aquatic resources. However, only five species were collected alive: lilliput (*Toxolasma parvus*), pondhorn (*Uniomerus tetralasmus*), giant floater (*Pyganodon grandis*), paper pondshell (*Utterbackia imbecillis*), and fragile papershell (*Leptodea fragilis*). These live mussels were collected from four water bodies (Mauvaise Terre Creek, Schuy-Rush Lake, Bluff Ditch, and Grindstone Creek). Most of the streams within the project area are considered too small or intermittent to support a diverse freshwater mussel fauna.

TABLE 2-22

Physical and Biological Parameters for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Surrounding Area Land Use	Riparian Vegetation	Stream Substrate	Stream Depth cm (in)	Stream Width m (ft)	Habitat Quality (score) ^a	Predominant Fish Species ^b	Total Number of Fish Species ^b	Comments
La Moine River Drainage Basin									
Troublesome Creek	Cattle grazing/ row-crops	Scrub-shrub	Clay and silt	50-100 (20-39)	7-10 (23-33)	Poor (65)	Red Shiner; Creek Chub	11	Feedlot runoff flows into this creek from a roadside ditch along the east side of the existing highway. A narrow scrub-brush riparian strip occurs sporadically along the reach of the stream downstream of the existing highway bridge.
Camp Creek	Row-crops	Grasses/ Trees	70% clay/silt 30% sand	40-70 (16-28)	7 (23)	Poor (75)	Red Shiner; Redfin Shiner; Bluntnose Minnow; Creek Chub	12	The creek is channelized upstream of the existing county road bridge. Riparian vegetation is comprised primarily of grasses, although a narrow band of floodplain trees are present nearby.
Grindstone Creek	Cattle grazing/ row-crops	Grasses/ Trees	Hard-packed clay and silt	10-100 (4-39)	3-5 (10-16)	Poor (80)	Red Shiner; Redfin Shiner; Bluntnose Minnow; Creek Chub Green Sunfish; Johnny Darter	10	Riparian vegetation is comprised primarily of grasses, although a narrow band of floodplain trees are present nearby.
Carter Creek	Cattle grazing/ row-crops	Willows/ Grasses	Silt, sand, or clay	10-40 4-16)	1.5-5.0 (4.9-16)	Poor (70)	Central Stoneroller Bluntnose Minnow Creek Chub Green Sunfish Johnny Darter	16	The stream flows through relatively flat terrain and channelization appears to have occurred 5 to 8 years ago. The stream supports a narrow riparian zone of willow in some locations, but is devoid of trees elsewhere. Carter Creek is an intermittent stream and was dry during the October 1996 monitoring.

TABLE 2-22

Physical and Biological Parameters for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Surrounding Area Land Use	Riparian Vegetation	Stream Substrate	Stream Depth cm (in)	Stream Width m (ft)	Habitat Quality (score) ^a	Predominant Fish Species ^b	Total Number of Fish Species ^b	Comments
Ryan Branch	Row-crops/ cattle grazing	Grasses	70% clay/silt 30% sand	30-50 (12-20)	3.0 (9.8)	Poor (50)	Southern Redbelly Dace; Creek Chub; Black Bullhead	6	The stream has been channelized and the banks lined with stone (10-30 cm) for erosion control. Many pieces of stone are present on the bottom of the stream, particularly in the pool just upstream of the existing road culvert. Grasses are the predominant vegetation; no trees shade the site. The channel was dry during an October 1996 visit.
Horney Branch	Forest/ row-crops	Forest	60% sand 30% gravel 10% cobble	5-10 (2-4)	1.5 (4.9)	Good (135)	Creek Chub; Orangethroat Darter	6	Oak and hickory forest provides riparian vegetation and a partially closed canopy. The stream was dry during the October 1996 monitoring.
Central Illinois River Drainage Basin									
W. Branch Sugar Creek	Forest/ pasture	Oak and Hickory Forest	70% clay/silt 30% gravel	7 (2.8)	4-7 (13-23)	Good (130)	Central Stoneroller; Red Shiner; Bigmouth Shiner; Bluntnose Minnow; Creek Chub; Johnny Darter; Orangethroat Darter	10	Oak and hickory forest provides a partially closed canopy. Cattle grazing is present along the north bank where large trees have been bulldozed up to the edge of the stream.
E. Fork Crane Creek	Forest/ pasture	Floodplain/ Upland Forest	60% sand 30% gravel 10% cobble	5-20 (2-8)	1 (3.3)	Good (120)	Central Stoneroller; Bigmouth Shiner; Creek Chub	11	Oak and hickory forest provide riparian vegetation and a partially closed canopy. The creek was dry during the October 1996 monitoring.

TABLE 2-22

Physical and Biological Parameters for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Surrounding Area Land Use	Riparian Vegetation	Stream Substrate	Stream Depth cm (in)	Stream Width m (ft)	Habitat Quality (score) ^a	Predominant Fish Species ^b	Total Number of Fish Species ^b	Comments
Bluff Ditch	Row-crops	Grasses/ Few Trees	Mud and clay	10–20 (4–8)	5 (16)	Poor (40)	Goldfish; Bigmouth Buffalo; Blackstripe Topminnow; Green Sunfish	9	The site is heavily modified by channelization and levee formation. Bluff Ditch is an intermittent stream and was dry during the October 1996 monitoring.
Coal Creek Ditch	Row-crops	Grasses	Flocculent silt over clay	50-100 (20-39)	15-20 (49-65)	Poor (30)	Gizzard Shad; Red Shiner; Western Mosquitofish; Orangespotted Sunfish; Bluegill	9	The site was heavily modified by channelization and levee formation. Grasses were the only riparian present at the sample location, but trees were present both upstream and downstream of the site.
Illinois River	Row-crops/ pasture	Floodplain Forest	NA	NA	301 (988)	NA	Gizzard Shad; Bluegill; Largemouth Bass; Carp	33	
Schuy-Rush Lake	NA	NA	Silt and clay		263 (863)	NA	Gizzard Shad; Red Shiner; Bluegill	5	
Lower Illinois River Drainage Basin									
Indian Creek	Row-crops	NA	60% clay/silt 40% sand	80 (31)	11–13 (36–43)	Poor (50)	Sand Shiner	13	This large stream occurs in the Illinois River floodplain, and is channelized with levees for miles both upstream and downstream of this crossing. Its course is nearly treeless, receiving direct sunlight throughout the day. A clay/silt material covers much of the sandy substrate in areas with slow flow; sand comprises the substrate in areas with greater flow. Several reaches of the channel include areas of shifting sand. Organic debris pinned under existing bridge deck supports, suggest a high water

TABLE 2-22

Physical and Biological Parameters for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Surrounding Area Land Use	Riparian Vegetation	Stream Substrate	Stream Depth cm (in)	Stream Width m (ft)	Habitat Quality (score) ^a	Predominant Fish Species ^b	Total Number of Fish Species ^b	Comments
									mark, depth exceeding 7 m (23 ft.), during extreme flooding.
Clear Creek	Row-crops	Grasses/ few trees	Sand	3 (1)	NA	Poor (NA)	Gizzard Shad; Red Shiner; Carp; Creek Chub; Bluegill	15	Channelization, levees, and row-crops characterize the stream reach for several miles up and downstream of the crossing. Trees are limited to a scrubby line no more than a few meters wide, and grass is the predominant riparian vegetation. The streambed is a continuously-moving river of sand with just a few centimeters of water flowing over the substrate. No pools were observed, except those at drainage control structures.

TABLE 2-22

Physical and Biological Parameters for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Surrounding Area Land Use	Riparian Vegetation	Stream Substrate	Stream Depth cm (in)	Stream Width m (ft)	Habitat Quality (score) ^a	Predominant Fish Species ^b	Total Number of Fish Species ^b	Comments
Prairie Creek	Row-crops	Trees	Concrete rubble and other building materials/ fine-to-course sand, and sand and silt	5–25 (2–10)	5–9 (16–30)	Poor (75)	Red Shiner; Hornyhead Chub; Bigmouth Shiner; Bluntnose Minnow; Creek Chub	18	Only a narrow, <10 m (<33 ft.) tree line separates row-crop fields from the stream. Stream banks are heavily eroded below nearby bridges, producing a deep ravine with steep slopes. The substrate composition is almost exclusively fine-to-coarse sand; some of the deeper pools were filled with a mixture of sand and silt. Railroad and highway debris block the channel beneath the existing bridge. The stream was completely dry during the INHS site visit, with the exception of a few deeper pool areas, which held small amounts of stagnant water.
Mud Creek	Row-crops/ cattle grazing	Willows	Sand/silt	NA	NA	Poor (NA)	Hornyhead Chub; Bigmouth Shiner; Creek Chub	5	A narrow riparian zone of willows and a channelized bank characterize the site.
Tributary to Mud Creek	Row-crops/ forest	Forest	Sand and silt	NA	NA	Poor (NA)	None	0	Mature forest provided a partly-open canopy. The north bank had <25 m (82 ft.) riparian buffer strip between the stream and row-crops. However, all pools were shallow, indicating that runoff from fields was often laden with sediment. It is likely that this tributary flows only after heavy rains.

TABLE 2-22

Physical and Biological Parameters for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Surrounding Area Land Use	Riparian Vegetation	Stream Substrate	Stream Depth cm (in)	Stream Width m (ft)	Habitat Quality (score) ^a	Predominant Fish Species ^b	Total Number of Fish Species ^b	Comments
Coon Run Creek	Row-crops	Trees	30% clay/silt 30% sand 25% gravel 15% cobble	10–45 (4–18)	2.5 –6.1 (8.2–20)	Fair (100)	Gizzard Shad; Goldfish; Red Shiner; Bigmouth Shiner; Sand Shiner; Creek Chub; Yellow Bullhead	16	A narrow riparian zone produced an open canopy over the stream. Deeply incised bank-slopes and bank failures are present; most pools are shallow to this heavy erosion. Cobble is present in riffles under the existing bridge. Sand and gravel comprise the substrate of the other small riffles, but a layer of silt covers the many of the sand and fine gravel sediments.
Willow Creek	Row-crops	NA	70% clay/silt 30% clay	1–10 (0.4–4)	1–2 (3–6)	Poor (35)	Shortnose Gar; Goldfish; Carp; Sand Shiner	7	This segment of the stream lies in the floodplain of the Illinois River. Channelization, levee formation, and removal of trees from the riparian zone have modified this reach of stream.
Spring Run Creek	Row-crops/ cattle grazing	NA	50% clay/silt 10% clay 20% sand 10% gravel 10% cobble	10-60 (0.4-24)	1-2.5 (3-8.2)	Good (125)	Creek Chub	1	Spring Run Creek is a minor tributary to Coon Run Creek. Large mineral substrates that had eroded from the local shale and sandstone outcrops occurred along the stream bed. The creek may flow only intermittently during summer months.
Lick Branch	Row-crops	Grasses	Silt, sand, clay	NA	NA	Poor (NA)	Flathead Minnow	1	Lick Branch probably flows intermittently during summer months.

TABLE 2-22

Physical and Biological Parameters for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Surrounding Area Land Use	Riparian Vegetation	Stream Substrate	Stream Depth cm (in)	Stream Width m (ft)	Habitat Quality (score) ^a	Predominant Fish Species ^b	Total Number of Fish Species ^b	Comments
Mauvaise Terre Creek	Forest/ hay fields/ orchards	Floodplain/ Upland Forest	60% clay/silt 20% sand 10% gravel 10% cobble	30–>100 (12–>39)	9–13 (30–43)	Fair (105)	Carp; Red Shiner	10	A lagoon-type sewage treatment facility serving a large trailer park is located about 2 km (1.2 mi) upstream; its drainage is to Mauvaise Terre Creek. A narrow floodplain forest covers the south bank and the north bank is steep and wooded, producing a dense canopy over the stream. Stream depth ranges from 0.3 m (1 ft.) at bridge to over 1 m (3.3 ft.) in pools upstream of the bridge.
Tributary to Mauvaise Terre Creek	Row-crops/ hog grazing	Forest/ scrub-shrub/ grass	Silt, sand, clay	NA	NA	Poor (NA)	Flathead Minnow	1	The local riparian zone consisted of 30- to 50-year old trees, but the understory has been almost completely denuded of vegetation by hog grazing. Dead livestock were found in the stream bed. The creek probably dries during summer months.

^a > 150 points = excellent condition, 120 – 149 = good condition, 100 – 119 = fair condition, and < 100 = poor condition^b Illinois River fish data is for Panther Slough (river mile 99)

NA = not available

2.3.2.2 Water Quality Description of Surface Water Bodies

The IEPA evaluates water quality conditions in terms of the degree waters attain designated individual uses, including aquatic life, swimming, drinking water, recreation, secondary contact, indigenous aquatic life use, and fish consumption. In addition, an aggregate assessment of the overall use support is provided. The following use support designations are assigned by the IEPA.

- **Full Support**—The water quality meets the needs of all designated uses protected by applicable water quality standards.
- **Full Threatened Support**—Water quality is presently adequate to maintain designated uses, but if a declining trend continues, only partial support may be attained in the future.
- **Partial Support**—Water quality is impaired and the waterbody is only partially meeting the needs of its designated use.
- **Nonsupport**—Water quality is severely impaired and not capable of supporting the designated use to any degree.

Water resources with use support attainments of Full or Full Threatened are considered “good,” Partial are considered “fair,” and Nonsupport are considered “poor.”

The IEPA assigned overall use support assessments for seven water bodies within the project area. Four creeks/rivers received an overall use support assessment of “full support” (Troublesome Creek, Camp Creek, Grindstone Creek, and Illinois River), two creeks received an overall use assessment of “partial support” (Indian Creek and Mauvaise Terre Creek), and Schuy-Rush Lake received an overall use support assessment of “partial support.”

The sources for the IEPA use support impairments include municipal point source discharge, agricultural runoff, and habitat modification (channelization and removal of riparian vegetation). Water quality degradation includes elevated phosphorus and nitrogen levels, low dissolved oxygen (DO) concentrations, siltation, and algal growth.

Water quality sampling was conducted quarterly for 15 streams within the project corridor from 1995 to 1997. Water samples were analyzed for a variety of water quality parameters including DO, total suspended solids (TSS), chloride, sulfate, barium, iron, lead, manganese, nickel, silver, zinc, and mercury. Similar U.S. Environmental Protection Agency (USEPA) STORET water quality data for the Illinois River Station at Valley City (40 kilometers, or 25 miles, south of Beardstown) was provided by the IEPA for the 5-year period from January 1994 to December 1998. Average concentrations for all quarterly water quality sampling (1995 through 1997) and IEPA STORET data are presented in Table 2-23. The data were compared against the IEPA General Water Quality Standards to determine if there were “excursions” from IEPA standards. An excursion would be represented by a value that either is higher than a not-to-exceed criterion (e.g., metals) or falls below a not-to-be-less-than criterion (e.g., DO). The data evaluation showed that the

concentrations for these parameters in the study area streams generally met IEPA criteria, with only occasional “excursions.”

All streams had average DO, manganese, and mercury concentrations well within the IEPA General Water Quality Standards (Table 2-23). However, occasional “excursions” for these parameters were observed during field sampling events. These “excursions” are considered to represent isolated exceedances. The water quality for all streams are well within accepted IEPA General Water Quality Standards.

TABLE 2-23
Water Chemistry for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Dissolved Oxygen (mg/L)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sulfate-S (mg/L)	Barium (µg/L)	Iron (µg/L)	Lead (µg/L)	Manganese (µg/L)	Nickel (µg/L)	Silver (µg/L)	Zinc (µg/L)	Mercury (µg/L)
Water Quality Standards *	> 5.0	1,000	500	500	5,000	1,000	72	1,000	1,000	5.0	1,000	1.3
La Moine River Drainage Basin												
Troublesome Creek	9.6	290	22	29	76	10	<50	120	<30	NA	21	0.18
Camp Creek	10.9	346	23	36	98	<10	<50	79	<30	NA	9	0.12
Grindstone Creek	10.4	428	48	47	100	<10	<50	239	<30	NA	17	0.36
Carter Creek	9.7	354	31	46	90	<10	<50	246	<30	NA	17	0.26
Ryan Branch	10.2	324	114	38	122	<10	<50	410	<30	NA	24	0.09
Horney Branch	8.0	422	37	49	92	<10	<50	71	<30	NA	125	0.12
Central Illinois River Drainage Basin												
W. Branch Sugar Creek	8.3	538	29	47	84	<10	<50	192	<30	NA	31	0.11
E. Fork Crane Creek	9.5	450	27	40	95	<10	<50	470	<30	NA	13	0.25
Bluff Ditch	12.8	495	19	125	68	<10	<50	189	<30	NA	21	0.19
Coal Creek Ditch	12.3	461	30	42	78	<10	<50	106	<30	NA	28	0.12
Illinois River												
1994	9.1	NA	60	67	52	98	5	29	16	3.1	118	0.05
1995	10.4	NA	85	71	50	55	5	22	25	3.0	141	0.07
1996	9.4	NA	61	72	46	64	5	18	25	3.0	100	0.05
1997	9.1	NA	65	62	47	52	5	15	25	3.0	100	0.10
1998	6.4	NA	67	70	48	50	5	15	25	3.0	100	0.10

TABLE 2-23

Water Chemistry for Surface Water Resources of the U.S. 67 Project Corridor

Water Resource	Dissolved Oxygen (mg/L)	Total Dissolved Solids (mg/L)	Chloride (mg/L)	Sulfate-S (mg/L)	Barium (µg/L)	Iron (µg/L)	Lead (µg/L)	Manganese (µg/L)	Nickel (µg/L)	Silver (µg/L)	Zinc (µg/L)	Mercury (µg/L)
Water Quality Standards *	> 5.0	1,000	500	500	5,000	1,000	72	1,000	1,000	5.0	1,000	1.3
Lower Illinois River Drainage Basin												
Indian Creek	10.6	372	14	49	66	<10	<50	279	<30	NA	49	0.55
Coon Run Creek	13.4	526	25	41	98	<10	<50	129	<30	NA	11	0.89
Willow Creek	12.5	527	15	47	90	<10	<50	173	<30	NA	10	0.05
Spring Run Creek	9.5	592	31	64	94	<10	<50	71	<30	NA	41	0.22
Mauvaise Terre Creek	9.2	536	79	99	52	<10	<50	70	<30	NA	58	0.21

Source for Illinois River data is IEPA STORET

All other data is average values for INHS Water Quality Reports (November 28, 1995, February 8, 1996, May 29, 1996, August 28, 1996, and November 5, 1996)

* Illinois General Use Water Quality Standards. IEPA (Bureau of Water). Illinois Water Quality Report 2000

Mercury: Chronic Standard - not to be exceeded by the average of at least four consecutive samples collected over any period of at least 4 days

Lead: Chronic Standard - $\exp[A+B\ln(H)]$ where $A=-2.83$ $B=1.273$ H =hardness in mg/L ($H = 274\text{mg/L}$; 1994-1998 average for Illinois River)

2.3.2.3 Summary of Surface Water Bodies

Schuy-Rush Lake is a public lake owned and managed by the City of Rushville that has received special designation as a “significant public water” by the IEPA, Division of Pollution Control, on the basis of its size, public access, and recreational use. The lake was built in the mid-1970s by constructing a dam across Crane Creek and has a surface area of 91 hectares (225 acres). Water levels fluctuate dramatically, leaving near-shore areas exposed as mud flats. The substrate is exclusively silt and clay. Schuy-Rush Lake has been classified as hypereutrophic and the IEPA has assigned it an overall use assessment of partial support.⁷ The lake “fully supports” fish consumption use and live mussels, giant floater (*Pyganodon grandis*) and lilliput (*Toxolasma parvus*), were collected at the site. The lake “partially supports” aquatic life, swimming, and drinking water supply uses. Causes of overall use impairment for Schuy-Rush Lake include excess nutrients, siltation, suspended solids, and noxious aquatic plants. Sources of these impairments include agricultural runoff, municipal treatment, habitat modification, and contaminated sediments (chromium and cadmium).

The Illinois River is a major navigable river. The river received an IEPA overall use assessment of “full support” within the Central and Lower Illinois River drainage basin. The river “fully supports” aquatic life, “partially supports” swimming, and is a “nonsupport” for fish consumption. Cause and source of the designated use support impairments were not specifically identified by the IEPA. However, the major water quality issues throughout the Central and Lower Illinois River basin include sedimentation, toxic chemicals in sediment, high concentrations of nutrients and agricultural chemicals, and low DO (Warner and Schmidt 1994). The Illinois River was not surveyed as part of the BSC classification or project specific INHS field activities, but considerable historic data is available for the river reach located within the project area. A fish survey was conducted in 1995 at Panther Slough (River Mile 99). A total of 33 fish species were identified during the survey. The predominant fish species were gizzard shad (*Dorosoma cepedianum*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), and carp (*Cyprinus carpio*), representing 36 percent, 25 percent, 8 percent, and 6 percent of the total catch, respectively. A mussel survey for the Illinois River (River Mile 84.0 to 87.8) was conducted from 1993 through 1995 (Whitney et al. 1997). A total of 12 mussel species were reported for this reach of river. However, only one species, pink papershell (*Potamilus ohiensis*), was found at the existing Illinois River Beardstown Bridge.

Curry Lake (York) is a large backwater slough of the Illinois River. The banks of the Illinois are lined with lakes and backwaters that are now abandoned meander loops of the Illinois River. However, the natural sedimentation processes that formed the backwaters have been altered and accelerated by human activities such as agriculture, levee building, and urbanization. Of the 300 backwater lakes that were once along the

⁷ Hypereutrophic means high in nutrient content, which contributes to low dissolved oxygen levels and high levels of turbidity, thereby reducing aquatic species habitat.

lower Illinois River in 1903, only 53 presently remain; 30 to 99 percent are filled by sediment (Talkington 1991).

Grindstone Creek received an IEPA overall use assessment of “full support” and a BSC classification as a highly valued aquatic resource. Grindstone Creek also supports a fish species that is relatively intolerant of degraded water quality conditions, Johnny Darter (*Etheostoma nigrum*), and live mussels, Lilliput (*Toxolasma parvus*). However, field surveys of the potentially impacted stream reach concluded that the overall habitat quality was poor and cited cattle grazing and row-crops as the predominant land use adjacent to the creek. Smith (1971) and Page et al. (1992) also surveyed Grindstone Creek and both described widespread agricultural pollution in the area as being a major threat to the creek.

Mauvaise Terre Creek received an IEPA overall use assessment of “partial support.” The creek “fully supports” fish consumption, “partially supports” aquatic life, but is a “nonsupport” for swimming. Causes of overall use impairment for the creek include excess phosphorus, habitat alteration, and algal growth. Sources of these impairments include municipal point source, agricultural runoff, channelization, and removal of riparian vegetation. Field survey of the potentially impacted reach concluded that the overall habitat quality for the creek was fair. A narrow floodplain forest covers the south bank of the creek and the north bank is steep and wooded, producing a dense canopy over the stream. A lagoon-type sewage treatment facility serving a large trailer park upstream of the project area discharges to Mauvaise Terre Creek. Despite the apparent water quality impairments, the creek does support two mussel species: fragile papershell (*Leptodea fragilis*) and Asiatic clam (*Corbicula fluminea*).

Indian Creek received an IEPA overall use assessment of “partial support” and BSC classification as a highly valued aquatic resource. However, field survey of the potentially impacted reach concluded that the overall habitat quality for the creek was poor. Page et al. (1992) surveyed the Indian Creek drainage and concluded that it rated no special designations or protection. Furthermore, Page et al. (1992) discussed severe in-stream and riparian habitat damage along the majority of the drainage system.

Troublesome Creek and Camp Creek received overall use assessments of “full support” and BSC classifications as moderate aquatic resources. However, field survey of the potentially impacted reaches concluded that the overall habitat quality for both creeks was poor. Smith (1971) and Page et al. (1992) also surveyed the creeks and described the widespread, and in some **cases**, severe, agricultural pollution in the area as being a major threat to the drainage. Accordingly, field surveys indicate that cattle grazing and row-crops are the predominant land use adjacent to both creeks within the project area. Feedlot runoff flows into Troublesome Creek from a roadside ditch along the east side of the highway.

Four creeks within the project area were identified during field surveys as having good habitat quality. Three of these creeks are located west of the Illinois River: Horney Branch

(La Moine River drainage basin), West Branch of Sugar Creek (Central Illinois River drainage basin), and East Fork of Crane Creek (Central Illinois River drainage basin). Spring Run Creek (Lower Illinois River drainage basin) is located east of the Illinois River. Horney Branch and the West Branch of Sugar Creek also support fish species that are relatively intolerant of degraded water quality conditions: orangethroat darter (*Etheostoma spectabile*) and Johnny darter (*Etheostoma nigrum*).

2.3.3 Wetlands

2.3.3.1 Review of Existing Wetland Information for the Project Area

Sources of published data, including National Wetland Inventory (NWI) Maps, were used to conduct preliminary evaluation of the extent of wetlands occurring within the project area. Wetland resources, NWI mapping, for McDonough, Schuyler, Cass, and Morgan counties are summarized in "Wetland Resources of Illinois; An Analysis and Atlas (Suloway and Hubbell 1994). The NWI data are presented in Table 2-24.

TABLE 2-24
Wetland Resources within the Project Area

County	Total NWI ha (ac)	Percent of Total County Area	Percent of Total County Area (Natural Wetland)	Percent of Total County Area (Modified/ Artificial Wetland)
McDonough	3,223 (7,966)	2.1	1.8	0.3
Schuyler	4,156 (10,270)	3.7	2.1	1.5
Cass	7,129 (17,616)	7.2	3.4	3.9
Morgan	2,497 (6,170)	1.7	1.2	0.5

2.3.3.2 Field Evaluation of Wetlands Located Within the Project Area

Field surveys were conducted from 1995 to 1998 to verify the presence of wetlands identified during the resource material review and to identify any additional wetlands located within the project area. For the purposes of complying with the Section 404 program, the federal government endorses the use of two separate delineation manuals: the 1987 Corps of Engineers *Wetlands Delineation Manual* and the Department of Agriculture's *National Food Security Manual* (third edition). A 1994 Federal Memorandum of Agreement between the Department of Defense, Department of Interior, USEPA, and the USDA defines situations for which these two manuals may be applied. It requires the use of the *1987 Corps of Engineers Wetland Delineation Manual* (with current U.S. Corps of Engineers' [USACOE] regulatory guidance) by all federal resource agencies on non-agricultural land for Section 404 purposes. When determinations or delineations are made on agricultural lands for Section 404 purposes, the *National Food Security Act Manual* must be used.

Wetlands within the project area were delineated in accordance with the Routine On-Site Wetland Determination methodology in *The 1987 Corps of Engineers Wetland Delineation Manual* (hereafter, *The Manual*).

There were 236 locations evaluated within the project area for the presence of wetlands. Of these, 137 were found to meet the three parameters of wetlands. Wetland function was assessed qualitatively for each site during the field delineations. Field assessments were based on visual observations, including plant community composition and structure, landscape position, surrounding land uses, hydrologic inputs and discharges, and soils.

The Floristic Quality Assessment (FQA) methodology (Wilhelm et al. 1999) was applied to plant communities (jurisdictional wetlands and upland communities) assessed in the project area. The FQA method is based on a numerical rating of plant communities, termed the Floristic Quality Index (FQI). The numerical rating describes the natural quality of plant communities. The basis of the numerical rating is the assignment of coefficients of conservatism (numbered 0-10) to each plant species known to occur in Illinois. Higher coefficients of conservatism are generally assigned to those plant species that are native, rare, and found in specialized habitats. Lower coefficients of conservatism are generally assigned to those plant species that are non-native, common, and habitat generalists. Once a comprehensive plant species list has been compiled for a natural area remnant, the FQI is calculated for the remnant. An FQI of 10 or less is indicative of disturbed sites with very little natural quality. An FQI of 20 or more is indicative of a plant community with considerable natural character. Calculated values of FQI in this document include all native and non-native plant species recorded at the site.

Appendix J of this document summarizes information about each wetland, including the Cowardin Classification, NRCS designation, total size, and FQI.

Within the study area, the four predominant wetland types include:

- **Palustrine Forested Wetlands (PFO1)**—Broad-leaved, deciduous forested wetlands typically known as swamps. Within the project area, these communities consist primarily of areas of floodplain forest along or in association with small creeks and drainages, as well as more extensively along Mauvaise Terre Creek and the Illinois River near Beardstown. Species such as elm and silver maple are common in these locations. Other species present include cottonwood, sycamore, black willow, and green ash.
- **Palustrine Scrub/Shrub Wetlands (PSS1)**—Wetlands dominated by small trees and shrubs are identified as PSS1 communities. Species of willow and dogwood dominate the PSS1 wetlands in the project area. Many of these wetland types are found in conjunction with forested wetlands (PFO1). In these cases, periodic flooding and overland flow provide the primary source of hydrology. Small areas of PSS1 are also found along the margins of some ponds and lakes.

- **Palustrine Emergent Wetlands (PEM)**—PEM wetlands consist of marshes, wet meadows, wet prairies, and sloughs that are dominated by perennial herbaceous vegetation. Within the project area, PEM wetlands consist mainly of depressions, vegetated waterways, and stream banks. Extensive marshes with open water and emergent vegetation occur primarily in the Beardstown area. PEM wetlands support a relatively wide variety of wetland plants. Species such as reed canary grass and cattail occupy many depressional areas, while species of bulrush and sedge are found in other locations. The marshes in the Beardstown area support a number of emergent species that include arrowhead and American lotus.
- **Palustrine Unconsolidated Bottoms (PUB)**—These sites consist primarily of constructed farm and stock ponds. These ponds are often small, less than 0.5 hectare (1.2 acres) in size, and often support wetland vegetation including willow and various emergent species such as bulrush and cattail. Several locations, identified on NWI maps as PUB, were examined in the field and were found not to meet the required criteria for jurisdictional wetland determination and therefore are not included in this report.
- **Other Cowardin Classifications (various)**—Several areas were mapped as Palustrine Aquatic Bed (PAB) and Palustrine Open Water (POW). PAB wetlands are dominated by floating-leaved vegetation such as lily pads. POW wetlands are generally sparsely vegetated, though vegetation may be present near the perimeter. Other wetland classifications within the project area include combinations of various Cowardin wetland classes.

Within the project area, PFO1 wetlands comprise the largest percentage of wetlands by area (42 percent), followed by PEM wetlands (30 percent). The areas of PUB and PSS1 wetlands comprise 4 and 1 percent of the total wetland area, respectively. This information is summarized in Table 2-25.

Many of these wetlands are scattered, isolated communities, or narrow bands along small creeks and drainages. As a result, the majority of wetlands delineated in the project area provide some level of floodwater and sediment retention, water quality protection, and wildlife habitat function. A small number of wetlands provide fish rearing habitat, aesthetic and recreational values, a high level of floral diversity, and/or groundwater discharge.

TABLE 2-25
Acreage of Wetland Types in the Project Area

Wetland Type	Number	% by Number	Total Area ha (ac)	Percentage by Area
PUB	42	31	9.8 (24.2)	4
PEM	40	29	69.9 (172.8)	30
PFO1	20	15	99.4 (245.5)	42

TABLE 2-25
Acreage of Wetland Types in the Project Area

Wetland Type	Number	% by Number	Total Area ha (ac)	Percentage by Area
PSS1	6	4	2.7 (6.7)	1
Farmed Wetland	7	5	11.3 (28.0)	5
Other	22	16	43.3 (107.0)	18
Totals	137	100	236.4 (584.2)	100

2.3.3.3 Wetland Complexes in the Project Area

Several wetlands complexes within the U.S. 67 project area are notable because of factors including size and diversity, observed occurrence of state or federally listed taxa, relative rarity of wetland type, wildlife habitat, designation as Illinois Natural Areas or Illinois Nature Preserves, or recreational opportunities. Notable wetland complexes within the U.S. 67 project area occur in the areas of Beardstown Marsh, Mauvaise Terre Creek, various sand ponds, Schuy-Rush Lake, and the Illinois River. Wetland details are provided as Appendix J; locations are depicted in Figure 4-2 and Exhibits: Green 1-25, Blue 3-9, and Orange 2-10.

Beardstown Marsh (Sites 1-30, 50-60, 205, and 208). Beardstown Marsh is an extensive wetland complex immediately to the south and west of Beardstown that formed in ancient meander loops of the Illinois River. Beardstown Marsh is a unique resource because of its size, diversity, habitat for several threatened or endangered species, and its designation, in part, as an Illinois Natural Area. Federal or state listed species known currently to breed or grow within the Beardstown Marsh include the decurrent false aster, Vahl's fimbriatylis, Hall's bulrush, and the king rail. A portion of the marsh area, about 26 hectares (64 acres), is designated as an Illinois Natural Area. The Beardstown Marsh wetland area contiguous with and including the Illinois Natural Area is about **189** hectares (**468** acres). Wetland types interspersed throughout the Beardstown Marsh complex are temporarily flooded floodplain forests and scrub-shrub, seasonally flooded emergent marsh, and nearly permanently flooded lacustrine habitat.

Most of the individual wetlands within the Beardstown Marsh area are hydrologically connected through surface flows. Channels and drainage ways, some of which appear man-made, connect one wetland area to another. Farming in and around wetlands adjacent to the marsh disconnects some wetland bodies from others. Otherwise, these individual wetlands would form more of a single wetland unit. The source of wetland hydrology for the marsh and adjoining wetlands appears to be a combination of overland surface flow, river flooding, and groundwater discharge.

Mauvaise Terre Creek (Sites 90, 91, 93–95). Wetlands of Mauvaise Terre Creek occur primarily as a forested riparian zone. Parts of the Mauvaise Terre floodplain can be characterized as high quality floodplain forest, dominated by mature second growth (about 60 to 70 years old) silver maple and green ash. The site is a state and regionally significant wet-mesic community because of its size, contiguity, and ecological integrity. The site is subject to regular overland flooding from Mauvaise Terre Creek, which serves as the principle source of hydrology.

Mauvaise Terre Creek and its associated floodplain are a resource of uncommon quality in central Illinois. Though Mauvaise Terre Creek has been channelized in part, the palustrine forested floodplain associated with this waterway provides many valuable wetland functions such as flood retention, nutrient and sediment filtration, and wildlife habitat. The floodplain of the Mauvaise Terre Creek is diverse floristically. Based on plant species lists developed during detailed botanical work completed by the INHS, the FQI of the Mauvaise Terre Creek floodplain is 17.9. The Mauvaise Terre Creek wetlands within the project area are approximately 47 hectares (116 acres).

Schuy-Rush Lake (Site 46). Schuy-Rush Lake is a reservoir created from the impoundment of Crane Creek, a tributary of the Illinois River. Open water habitat predominates in the portion of the reservoir south of U.S. 67, while forested, emergent, scrub-shrub, and mudflat communities are most common north of U.S. 67. Schuy-Rush Lake and portions of adjacent uplands have been acquired as a regional park operated by the City of Rushville, and provide opportunities for active and passive recreation.

Since construction of the reservoir, wetlands have developed in association with Schuy-Rush Lake. Plant diversity is relatively low. However, plant communities are well-interspersed, which provides good foraging and loafing habitat for wildlife.

Sand Ponds (Sites AD1-01 through AD1-09). Extensive wind and water-borne deposits of sand exist in the Illinois River valley, particularly on the east side of the river. A distinctive wetland flora adapted to ephemerally wet sandy depressions are present in sand ponds of this area. Sand ponds are notable for the rarity of habitat, associated plant community, and because they provide refuge for many threatened and endangered plant and animal species.

Several sand ponds are known to be present in the U.S. 67 project area. All are located in the broad floodplain of the Illinois River from the Arenzville Bluffs north to Beardstown. Three sand ponds in the project area are designated Illinois Natural Areas: the Hagener Sand Pond, the Bulrush Sand Pond, and the Beardstown Fimbristylis Natural Area. The Shick Shack Sand Pond, also in the vicinity of the project area, is designated as an Illinois Nature Preserve. In addition, several sand ponds have developed in subsidence depressions of an abandoned sanitary landfill south of Beardstown. Sand ponds are described in more detail in Section 2.3.5.1, *Plant Communities and Habitat*.

Illinois River Wetlands (Sites 28, 30, 31, 33). Wetlands associated with the Illinois River are mostly palustrine forested with a minor component of emergent marsh. Floodplain forest along this reach of the Illinois River is typical of seasonally flooded wet-mesic forest along major waterways. These wetlands function to desynchronize peak flows on the Illinois River, filter sediment and nutrients, and provide cover for wildlife. Dominant tree species in forested floodplain along the Illinois River include silver maple and eastern cottonwood. Yearly inundation and scouring limits establishment of sapling, shrub, and herbaceous understory. Plant diversity is very low in seasonally flooded floodplain forest because only a limited number of plant species can withstand prolonged annual flooding.

2.3.4 Floodplains

Fourteen water bodies located within the project corridor have designated 100-year floodplains (Table 2-26; also see Appendix I for floodplain maps). Four of these resources are located in the La Moine River drainage basin, one is located in the Central Illinois River drainage basin, and nine are located in the Lower Illinois River drainage basin. Most of the floodplains associated with project area waterbodies consist of a narrow band adjacent to the waterways. However, the Illinois River has a great expanse of floodplain, including a large area along existing U.S. 67. Approximately 21 kilometers (13 miles) of existing U.S. 67, from near the IL 104/U.S. 67 intersection north to Beardstown, lies on the Illinois River 100-year floodplain. The area from Indian Creek to Beardstown, approximately 10 kilometers (6 miles), is protected from a 100-year flood event by a levee system constructed and maintained by USACOE.

TABLE 2-26
Designated 100-Year Floodplains Within the Project Corridor

Water Resource	Average Width of 100-Year Floodplain meters (feet)	Levee Status
La Moine River Drainage Basin		
Troublesome Creek	381 (1,250)	No
Camp Creek	152 (500)	No
Grindstone Creek	114 (375)	No
Carter Creek	76 (250)	No
Central Illinois River Drainage Basin		
Illinois River	see discussion above	Yes
Lower Illinois River Drainage Basin		
Indian Creek *	152 (500)	Yes
Clear Creek	610 (2,000)	Yes
Prairie Creek	229 (750)	No
Mud Creek	305 (1,000)	Yes
Tributary to Mud Creek	152 (500)	No
Coon Run *	305 (1,000)	Yes
Willow Creek *	152 (500)	Yes
Spring Run Creek *	152 (500)	Yes
Mauvaise Terre Creek	610 (2,000)	No

* Partially located within the Illinois River 100-year floodplain

Project-area floodplains, including vegetated riparian zones, provide flood and stormwater attenuation by decreasing water velocities and providing temporary storage. By storing water, floodplains remove and retain nutrients and sediments, provide erosion control, and provide wildlife habitat and movement corridors. These functions vary from one location to another depending on vegetative structure, stream hydrology, and the distance from the stream. See Table 2-22 for more detail concerning riparian vegetation and adjacent land use for each waterbody.

There are 12 drainage districts covering lands within the project area (Figure 2-8):

- Coal Creek Drainage District
- South Beardstown Drainage District
- Valley Drainage District
- Clear Creek Drainage District
- Meredosia Lake Drainage District
- Willow Creek Drainage District

- New Pankey's Pond Special Drainage District
- Lower Indian Creek Drainage District
- Mud Creek Drainage District
- Indian Creek Drainage District No. 2
- Mauvaise Terre Drainage District
- Coon Run Drainage District

2.3.5 Biological Resources

The project area lies within portions of four Natural Divisions of Illinois: the Western Forest-Prairie Division, the Upper Mississippi River and Illinois River Bottomlands Division, the Illinois River and Mississippi River Sand Areas Division, and the Grand Prairie Division.

The broad ancient terrace of the Illinois River extending from the Arenzville Bluffs north to Beardstown is an area of high biological diversity. The Arenzville Bluffs area mostly escaped the plow and the remaining loess hill prairies provide refuge for organisms adapted to dry conditions. Extensive wind and river-borne deposits of sand on the ancient Illinois River plain provide conditions suitable for rare plant communities such as xeric sand prairies, sand ponds, xeric forests, and sand savannas. Nearly half of all wetlands delineated within the project area are associated with abandoned meander loops of the Illinois River near Beardstown. Each of these plant communities supports a highly diverse assemblage of organisms.

Other areas with relatively high biological diversity include dissected areas associated with tributaries of the Illinois River, Mauvaise Terre Creek in the southern portion of the project area, and wooded areas immediately to the north of the Illinois River floodplain.

Biological surveys in the project area were conducted over a period of several years in order to assess wetland, riverine, and upland plant communities and occurrences of potential habitat for threatened and endangered species. Results of each survey are summarized in various technical reports (a Wetland Technical Report, Biological Resources Notebook) prepared and coordinated with the resource agencies. The technical reports form the basis of the natural resources discussion in this document.

2.3.5.1 Plant Communities and Habitat

Seventeen different cover types were mapped within the study area (Table 2-27). Cover types mapped are a modification of terminology used in the IDNR Natural Area Classification System and the U.S. Fish and Wildlife (USFWS) Classification System. Agricultural cropland and/or pasture account for 86 percent of the lands within the study area. Scattered forest cover occurs throughout the project area, mainly along stream ravines. Unfarmed bluff areas and urban areas account for 2 percent. The remaining cover types comprise 12 percent of the lands within the project area.

TABLE 2-27
Cover Types within the Project Area

Cover Type	Hectares (Acres)	Percent of Project Area
Agricultural land	16,009 (39,560)	86.0
Forbland/ Non-Native Grassland	1,024 (2,530)	5.5
Urban/ Developed land	372 (920)	2.0
Shrubland (non-wetland)	372 (920)	2.0
Fencerow	145 (360)	0.8
Mesic Forest	115 (283.7)	0.6
Floodplain Forest (wet-mesic)	99 (245.5)	0.5
Pine Plantation	102 (250)	0.5
Emergent Marsh	70 (172.8)	0.4
Loess Hill Prairie	79 (195.7)	0.4
Riverine	76 (188.0)	0.4
Various wetland types (wet meadow, aquatic bed, and open water)	54 (135.0)	0.3
Sand Prairie	35 (88.2)	0.2
Sand Pond	23 (57.2)	0.1
Xeric Forest/ Sand Savanna	19.6 (48.6)	0.1
Pond	9.8 (24.2)	0.1
Scrub/Shrub Wetland	2.7 (6.7)	<0.1

The natural quality of notable plant communities within the project area is described using the Natural Heritage Grading methodology of White (1978) and the FQA methodology of Wilhelm et al. (1999). These two methods should be viewed as complementary tools **used** to assess the natural quality of plant communities.

The Natural Heritage Grading methodology (White 1978) is based on the perceived magnitude of human-induced disturbance to a plant community. For purposes of this document, plant communities with Grades A through D are summarized. General definitions of each Grade are as follows:

- **Grade A**—A nearly pristine natural community with little evidence of disturbance, such as grazing or other agricultural activities.
- **Grade B**—A natural community “lightly disturbed” recently or in the past but with significant time to recover.

- **Grade C**—A moderate to heavily disturbed plant community but with sufficient natural character remaining to identify the pre-disturbance plant community type
- **Grade D**—A severely disturbed plant community in which nearly no natural character remains.

The FQA methodology, as described previously in Section 2.3.3.2, *Field Evaluation of Wetlands Located Within the Project Area*, was applied to plant communities assessed in the project area.

Several plant communities, uncommon in the Midwest, occur in the ancient Illinois River floodplain and associated bluffs; loess hill prairies, xeric sand prairies, sand ponds, and xeric forests/sand savannas. Botanical studies were undertaken on notable remnants of these rare plant communities. Results of the botanical studies are summarized in this document; details of the botanical studies are available as technical reports.

Agricultural Land. Agricultural land, for purposes of this document, includes row cropped land such as corn and soybeans and pasture land. Agricultural land occupies approximately 86 percent of the project area, the most prevalent cover type.

Mesic Forest. Mesic forests occur on moderately well- to well-drained soils on dissected ravines throughout the project area. Mesic forest remnants in the project area are generally steep enough to have escaped the plow, though all inventoried mesic forests have been disturbed as a result of logging, pasturage, or development. The predominant plant species of mesic forests in the project area include red, black, white, and burr oak, sugar maple, and a diversity of fern and forb species. Table 2-28, organized in descending rank order of FQI, summarizes the significant features and floristic integrity of mesic forests assessed in the project area.

Four mesic forests are located within close proximity to the proposed U.S. 67 alignments: Site 16 is shown on Figure 4-2: Green 12; Site 15 is shown on Figure 4-2: Green 13; Site 14 is shown on Figure 4-2: Green 19; Site 10 is shown on Figure 4-2: Blue 2 and Orange 2.

Loess Hill Prairies. Loess hill prairies occur on steep south to southwest facing slopes where intense sun and wind provide dry conditions for a diverse xerophytic plant assemblage. Loess hill prairies are generally dominated by short to mid-height grasses (side oats grama, dropseeds, little bluestem) and forb species (pale spike lobelia, asters). Historically maintained by fire, loess hill prairies are rapidly disappearing as a result of fire suppression and consequent encroachment of woody species. Several loess hill prairies have been inventoried within the project area and two have been designated as Illinois Natural Areas; Meredosia Hill Prairie Natural Area and Mud Creek Hill Prairie Natural Area. Table 2-29, organized in descending rank order of FQI, summarizes the significant features and floristic integrity of loess hill prairies assessed in the project area.

Two loess hill prairies are located within close proximity to the proposed U.S. 67 alignments: Site 7 is shown on Figure 4-2: Blue 6; Site 23 is shown on Figure 4-2: Orange 6.

TABLE 2-28

Summary of Floristic Integrity of Mesic Forests in the Project Area

Mesic Forest Site	Natural Areas Grading	Floristic Quality Index	Size - ha (ac)
Site 14: Sugar Creek Branch	Grade C	30.0	36 (90)
Site 10: Mauvaise Terre Creek	Grade C	30.7	14 (34)
Site 16: Roadside Picnic Area	Grade C	32.1	11 (27)
Site 9A	Grade D	9.0	9.6 (23.7)
Site 15: East Fork	Grade C	39.7	9 (23)
Site 6A	Grade D	21.1	6 (14)
Site 8A	Grade D	18.9	6 (14)
Site 9B	Grade C	12.5	5.9 (14.7)
Site 8B: Indian Creek	Grade C	27.2	5.9 (14.7)
Site 6B	Grade C	21.4	5.5 (13.6)
Site 7	Grade C to D	12.4	6.1 (15)

TABLE 2-29

Summary of Floristic Integrity of Loess Hill Prairies in the Project Area

Hill Prairie Site	Natural Areas Grading	Floristic Quality Index	Size - ha (ac)
Site 1B	Grade D	14.5	17.4 (43)
Site 21: Meredosia Hill Prairie Natural Area	Grade B	38.2	16 (39)
Site 1A	Grade C	28.4	9 (22.2)
Site 2	Grade C	32.2	8.4 (20.8)
Site 23: Eagle Bluff	Grade B	27.1	8 (19)
Site 1	Grade B	37.1	7 (17)
Site 9: Leischner Lane	Grade C	24.5	6.5 (16)
Site 7: Mud Creek Hill Prairie Natural Area	Grade B	36.1	4 (10)
Site 3A	Grade C	26.5	1.2 (2.9)
Site 3C	Grade C	21.1	1.2 (2.9)
Site 4	Grade B	27.6	0.73 (1.8)
Site 3B	Grade C	21.5	0.45 (1.1)

Sand Prairies. Sand prairies occur on deep deposits of wind and water-borne sands and support a diverse assemblage of extremely xerophytic prairie grasses (dropseeds, little bluestem), sedges (rough sand sedge), and forbs (sand horsemint, eastern prickly pear cactus). Sand prairies in Illinois provide refuge for many uncommon species disjunct from their western biogeographical ranges (Section 2.3.5.4, *Threatened and Endangered Species*). All sand prairies inventoried in the U.S. 67 project area lie within the broad ancient floodplain of the Illinois River from the Arenzville Bluffs to Beardstown. Sand prairie remnants remain in this area mostly because of relatively undeveloped railroad rights-of-way and diminished agricultural pressure in marginal soils. The Beardstown Railroad Sand Prairie is a designated Illinois Natural Area. Table 2-30, organized in descending rank order of FQI, summarizes the significant features and floristic integrity of sand prairies assessed in the project area.

Four sand prairies are located within close proximity to the proposed U.S. 67 alignments: Sites 2, 3, and 4 are shown on Figure 4-2: Blue 8; Site 1 is shown on Figure 4-2: Blue 9.

TABLE 2-30
Summary of Floristic Integrity of Sand Prairies in the Project Area

Sand Prairie Site	Natural Areas Grading	Floristic Quality Index	Size - ha (ac)
Botanical Site 2B	Grade C	19.2	10.9 (27)
Site 13: Boulevard Road Sand Prairie	Grade C	26.3	10 (25)
Site 2A	Grade B to C	21.5	4 (10)
Botanical Site 1A	Grade B to C	19.4	2.8 (6.8)
Site 2: Excell Sand Prairie	Grade C	26.1	2.5 (6.1)
Site 1: Beardstown Railroad Prairie Natural Area	Grade C	36.1	2.3 (5.7)
Site 4A	Grade D	11.5	1.78 (4.3)
Site 3: Southwest Corner of Sanitary Landfill	Grade B to C	19.6	0.9 (2.2)
Site 4: Sanitary Landfill Sand Prairie	Grade C	13.6	0.4 (1.1)
Very Degraded Sand Prairie	Grade D	2.3	NA

Sand Ponds. Sand ponds form in ephemerally saturated or inundated depressions in thick deposits of wind or water-borne sand and provide habitat for an assemblage of plant species adapted to short wet conditions and long periods of dry conditions. Species such as creeping love grass, spikerushes, and rushes commonly dominate these sites, as well as several uncommon plant and animal species (Section 2.3.5.4, *Threatened and Endangered Species*). Sand ponds inventoried in the project area are all on the broad ancient floodplain of the Illinois River extending from the Arenzville Bluffs to Beardstown. Three sand ponds in the project area are designated Illinois Natural Areas, Bulrush Sand Pond Natural

Area, Hagener Sand Pond Natural Area, and Beardstown Finbristylis Natural Area. Table 2-31, organized in descending rank order of FQI, summarizes the significant features and floristic integrity of sand ponds assessed in the project area.

Three sand ponds are located within close proximity to the proposed U.S. 67 alignments: Site 20 is shown on Figure 4-2: Orange 8; Sites 17 and 19 are shown on Figure 4-2: Blue 9.

TABLE 2-31
Summary of Floristic Integrity of Sand Ponds in the Project Area

Sand Pond Site	Natural Areas Grading	Floristic Quality Index	Size - ha (ac)
Site 20: Sand Pond South of Indian Creek	Grade C	19.3	8 (20)
Site 5: Sanitary Landfill Sand Pond	Grade C	11.3	8 (20)
Site 12: Bulrush Sand Pond Natural Area	Grade C	17.7	6 (15)
Site 6: Hagener Sand Pond Natural Area	Grade C	14.3	0.4 (1.1)
Site 19: Beardstown Fimbristylis Natural Area	Grade C	16.3	0.3 (0.7)
Botanical Site 3	Grade C	13.3	0.28 (0.7)
Site 17: Wal-Mart Sand Pond	Grade C	17.0	Unknown

Xeric Forests and Sand Savannas. Xeric forests and sand savannas occur on excessively-drained sand deposits and support an assemblage of plant species adapted to drought conditions. Xeric forest and sand savanna remnants inventoried within the U.S. 67 project area all occur on the broad ancient floodplain of the Illinois River from the Arenzville Bluffs to Beardstown. Predominant plant species at the sites include blackjack oak, black oak, and a variable understory with respect to disturbance history. Table 2-32, organized in descending rank order of FQI, summarizes the significant features and floristic integrity of xeric forests and sand savannas assessed in the project area.

TABLE 2-32
Summary of Floristic Integrity of Xeric Forests and Sand Savannas in the Project Area

Xeric Forest/ Sand Savanna Site	Natural Areas Grading	Floristic Quality Index	Size - ha (ac)
Botanical Site 6	Grade C	15.4	10.6 (26.2)
Botanical Site 5	Grade D	11.3	8.3 (20.4)
Site 3: Stock Ln.	Grade C	18.6	0.81 (2)

2.3.5.2 Invasive Plant Species

Executive Order 13112 (Invasive Species) directs federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals not native to the United States. The Illinois noxious weed list contains several plant species (musk thistle, Canada thistle, hemp, and perennial sowthistle) that occur within the project area. In addition, the department and other state agencies attempt to control

nuisance weeds on properties under their jurisdiction. Approximately 27.5 percent of the state's flora is composed of alien (introduced) plant species. A list of noxious and nuisance weeds that were observed in the project area are given in Table 2-33.

The list of nuisance and noxious weeds discussed in this section is based on species included in the *Vegetation Management Manual* (1990, V.1, No. 3-27), maintained by the Illinois Nature Preserves Commission and the USDA state list of noxious weeds for Illinois. The USDA state noxious weed list has been incorporated into The Illinois Noxious Weed Law and Rules. Refer to *The Vegetation Management Manual* and the USDA noxious weed database for the complete list of nuisance and noxious weed species in Illinois and appropriate management techniques. Three plant species not listed in the above sources are cheatgrass (*Bromus tectorum*), white sweet clover (*Melilotus alba*), and reed (*Phragmites australis*). These three species have been observed within the project area and have the potential to outcompete species native to Illinois.

The five most prevalent noxious plant species observed in project area wetlands are reed canary grass, multiflora rose, meadow fescue, moneywort, and wild turnip. The most prevalent plant invaders of sand prairies and sand savannas are little ragweed, cheatgrass, and Siberian elm. Invasive plant species present on the highest percentage of loess hill prairies are musk thistle, multiflora rose, meadow fescue, little ragweed, bull thistle, and yellow sweet clover. Multiflora rose, meadow fescue, and garlic mustard were the most prevalent invasive species in mesic upland forest within the project area. Detailed floristic work was completed only on a limited number of upland areas, particularly those sites that had potential to be remnants of natural plant communities. Detailed floristic work was not completed on early successional upland plant communities; thus, occurrences of upland nuisance and noxious weeds within the U.S. 67 project area are likely under-represented by those presented in Table 2-33.

Invasive or nuisance species can establish on the right-of-way during the initial highway construction or afterwards due to maintenance practices. The project is not expected to either introduce or increase invasive/nuisance species of plants.

TABLE 2-33
Nuisance Weeds Observed During Fieldwork within the Project Area

Scientific Name	Common Name	Presence in Delineated Wetlands (%)	Presence in Upland Botanical Sites (%)		
			Sand Prairie/ Sand Savanna	Loess Hill Prairie	Mesic Upland Forest
<i>Ambrosia artemisiifolia</i>	Little ragweed	NA	46	33	0
<i>Ambrosia trifida</i>	Giant ragweed	NA	8	8	23
<i>Cannabis sativa</i>	Hemp	0	7	8	0
<i>Carduus nutans</i>	Musk thistle	0	0	42	0

TABLE 2-33
Nuisance Weeds Observed During Fieldwork within the Project Area

Scientific Name	Common Name	Presence in Delineated Wetlands (%)	Presence in Upland Botanical Sites (%)		
			Sand Prairie/ Sand Savanna	Loess Hill Prairie	Mesic Upland Forest
<i>Sonchus arvensis</i>	Perennial sowthistle	0	0	0	0
<i>Phalaris arundinacea</i>	Reed canary grass	67	0	0	9
<i>Rosa multiflora</i>	Multiflora rose	17	8	42	82
<i>Festuca pratensis</i>	Meadow fescue	16	0	42	45
<i>Lysimachia nummularia</i>	Moneywort	9	0	0	9
<i>Pastinaca sativa</i>	Wild parsnip	8	0	0	18
<i>Robinia pseudo-acacia</i>	Black locust	5	8	8	9
<i>Cirsium vulgare</i>	Bull thistle	4	0	33	0
<i>Lonicera tatarica</i>	Tartarian honeysuckle	4	0	0	0
<i>Alliaria petiolata</i>	Garlic mustard	3	0	8	45
<i>Cirsium arvense</i>	Field thistle	3	0	0	0
<i>Lonicera maackii</i>	Amur honeysuckle	3	8	8	0
<i>Melilotus alba</i>	White sweet clover	3	8	0	0
<i>Melilotus officinalis</i>	Yellow sweet clover	3	0	33	0
<i>Lonicera japonica</i>	Japanese honeysuckle	0.9	0	0	0
<i>Lythrum salicaria</i>	Purple loosestrife	0.9	0	0	0
<i>Bromus tectorum</i>	Cheatgrass	0	31	17	0
<i>Lonicera morrowii</i>	Morrow's honeysuckle	0	0	0	27
<i>Ulmus pumila</i>	Siberian elm	0.9	15	0	0
<i>Elaeagnus umbellata</i>	Autumn olive	0	0	8	9
<i>Coronilla varia</i>	Trailing crown vetch	0	0	8	9

NA – not available

2.3.5.3 Wildlife Resources

Approximately 86 percent of the project area is agricultural, e.g., row-cropped, small grains, and pastured. The remaining 14 percent of land area is divided between developed land use and natural plant communities.

Agricultural land within the project area provides habitat for many common wildlife species. Mammal species such as white-tailed deer, raccoon, striped skunk, red fox, gray squirrel, fox squirrel, eastern cottontail, Virginia opossum, big brown bat, little brown bat, eastern pipistrelle, and several mouse species thrive in such habitat. Common songbird and other avian species in agricultural and urban land within the project area include English sparrow, starling, brown-headed cowbird, grackle, Eastern kingbird, Eastern bluebird, black crow, turkey vulture, red-tailed hawk, American kestrel, horned lark, and mourning dove. Most of these common wildlife species are habitat generalists and can occupy small upland plant communities located throughout the project area.

Common waterfowl species that use wetlands within the project area include Canada geese, mallard, blue-winged teal, green-winged teal, American coot, and wood duck (in forested wetlands). Common shorebirds within the project area include killdeer, great blue heron, and green heron.

2.3.5.4 Threatened and Endangered Species

The threatened and endangered species assessment was accomplished by consultation with state and federal resource agencies, review of published and file information, and field surveys. Consultation and correspondence with the USFWS concerning federally listed taxa and the IDNR Agency Action Report concerning state listed species are included as Appendix D.

The *Checklist of Endangered and Threatened Animals and Plants of Illinois* (Illinois Endangered Species Protection Board 1999), and *Endangered and Threatened Species of Illinois: Status and Distribution, Vol. 1 – Plants and Vol. 2 – Animals* (Herkert 1992) were consulted to confirm current listed species' status and basic biology.

Rigorous floristic and faunistic surveys for federally and state listed species were completed in the project area during the past decade and are summarized below.

Federally Listed Species.

Mammalian Species.

- **Indiana bat (*Myotis sodalis*)** (federally endangered). **The** Indiana bat winter habitat consists of caves and mines where individuals hibernate in characteristic dense clusters. Summer habitat includes a variety of wetland and riparian settings. Summer roosts usually are located beneath the exfoliated bark of dead trees, although roosts within cavities and under the bark of living trees have also been recorded. Roost trees used by pregnant and lactating Indiana bats are rarely less than 500 meters (0.3 miles) from paved highways, and generally are close to upland intermittent streams. Indiana bats may travel as far as 2.5 kilometers (1.6 miles) between roosting and foraging areas, and appear to prefer foraging in floodplain forests near perennial streams (Herkert 1992). Bats feed exclusively on flying insects (IBRT 1999).

Recent investigations have found evidence of Indiana bat summer breeding populations from 12 Illinois counties. Most other records of Indiana **bats** are of migrating individuals or adult males; breeding and non-breeding bats were observed in 25 Illinois counties (Herkert 1992).

The Indiana bat is known to occur historically in the project area but was not found during the course of the INHS field surveys. Wintering habitat for the Indiana bat is not present within the project area because of the absence of suitable caves. Forested maternity habitat for the Indiana bat is thought to be limited in the project area because of the rarity of mature forest. Forested areas associated with Mauvaise Terre Creek and the Illinois River are considered to represent the best foraging habitat for the Indiana bat within the project area, while areas around Schuy-Rush Lake, Indian Creek, and the West Branch of Sugar Creek may also be marginally suitable. Because of the limited marginal habitat present and no observed evidence of the Indiana bat within the project area, it is determined that the proposed roadwork would have no impact on this species.

Avian Species.

- **Bald eagle (*Haliaeetus leucocephalus*)** (federally threatened). The bald eagle prefers large, tall trees near rivers or reservoirs. Mature floodplain trees, often cottonwoods, are considered prime habitat. Eagles roost or nest in the upper branches of the tallest trees. Edges and openings in forests (riverbank, rangeland, cropland) are important for easy surveillance of food and accessibility. Large dead or dying trees are also frequently used as perches for similar reasons. Eagles prey primarily on small fish, but also on small mammals, waterfowl (particularly when injured), small birds, and carrion (e.g., road kills) (INHS 2000).

No bald eagle nests are known **to be** near the project area. Many wintering bald eagles were observed foraging along the Illinois River during INHS avian surveys. Bald eagles (non-breeding) were also observed in the Arenzville Bluffs during winter avian surveys of 1997. No night roosting habitat for the bald eagle is known from the project area. Construction of any proposed alternative would not impact the bald eagle or its habitat.

Plant Species.

- **Decurrent false aster (*Boltonia decurrens*)** (federally threatened). The decurrent false aster is a big river floodplain species typically found in wet meadows and on the borders of marsh and wetland areas. It favors full sun and is tolerant of somewhat disturbed conditions. The local biogeographic distribution of the decurrent false aster may be dependent in part on large river flooding events.

Hundreds of plants of the decurrent false aster are known **to be** from the Wal-Mart Sand Pond in the vicinity of Beardstown. Historical populations of the decurrent false aster have been recorded from other marshy habitat in the vicinity of Beardstown, but these have not been relocated despite considerable effort.

State Listed Species.

Avian Species.

- **Black-crowned night heron (*Nycticorax nycticorax*)** (state endangered). The black-crowned night heron seems adapted to a wide variety of habitats in which a wading bird may exist. The species depends on wetlands for food and is found near freshwater ponds, lakes, sluggish streams, swamps, marshes, backwaters, and shallow lagoons. The proximity of foraging areas might be the most important factor in nest site selection; therefore, black-crowned night-herons use a wide variety of upland and lowland tree species. Where suitable tree species cannot be found they will often conceal their nests in marsh vegetation.

The black-crowned night heron primarily eats fish and other aquatic life, including some algae and other succulent plants, but is also known to eat young birds and small mammals. They are largely but not strictly nocturnal and sometimes feed during the daytime. Most daylight hours are spent roosting in trees.

Three black-crowned night herons were observed in a wooded marsh behind the Wal-Mart in Beardstown. These observations were well outside the breeding season and it is assumed these birds were transients rather than area nesters. The proposed road improvements would have no impact on the black-crowned night heron.

- **King Rail (*Rallus elegans*)** (state endangered). The king rail is primarily a bird of freshwater marshes with emergent vegetation (sedge, bulrush, cattail), but probably occurs in a wider variety of habitats than any other rail. This species may be found in marshes, shrub swamps, ponds, streamside, roadside ditches, mudflats, or upland fields. As long as the terrain supports a reasonable amount of vegetation and is frequently wet, the king rail has the ability to adapt.

King rails usually feed in shallow water (up to 7.6 centimeters, or 3 inches) and are somewhat omnivorous. They feed largely on animal matter (beetles, grasshoppers, aquatic bugs, crayfish, and dragonfly nymphs), but also on aquatic bed or plant material. During the fall and winter, the king rail may feed on grain in cultivated fields.

Muskrats create an optimal habitat for king rails by opening up marshes and producing networks of pathways that provide potential feeding and drinking

places. Rice fields in Arkansas and Louisiana represent a “cultivated marsh” where the king rail is considered a to be a typical species.

King rails were heard in the easternmost portion of Beardstown Marsh during avian surveys and were assumed to be breeding. Proposed road improvements would not impact this portion of the marsh and therefore the king rail would not be impacted.

- **Brown Creeper (*Certhia americana*)** (state threatened). The brown creeper occupies dense stands of deciduous and mixed woodlands, with cypress swamps and floodplain forest apparently being its primary habitat. Relatively mature stands and dead trees with peeling bark are preferred for nesting. In Massachusetts, conditions that determine the distribution of brown creepers are apparently a very moist, humid atmosphere, dense evergreen tree growth, low sun penetration, and considerable extent of wild woodland that is not disturbed by man.

The brown creeper is usually solitary in its habits, but may migrate in small groups (three to six individuals) and has been seen foraging near groups of kinglets, chickadees, or titmice. Brown creepers are territorial during breeding season; territory sizes in Michigan range from 2.3 to 6.4 hectares (5.7 to 15.8 acres).

The brown creeper is a member of the bark foraging guild, primarily feeding on a variety of insect types and life stages and a small amount of vegetable matter (mast, seeds, nuts). The brown creeper does not disturb the bark like nuthatches or woodpeckers as it picks items from cracks and crevices and off the bark surface.

Brown creepers are a relatively common winter resident of West Central Illinois. They were observed within the project area during fall surveys: adjacent to Mauvaise Terre Creek on the north side of U.S. 67; between the Arenzville Bluffs and Beardstown on the west side of U.S. 67; and adjacent to the west side of the town of Arenzville. Brown creepers were also observed during fall surveys. However, the species was not observed in the project area during the breeding season. Therefore, the proposed road improvements will not impact the brown creeper.

- **Northern Harrier (*Circus cyaneus*)** (state threatened). The northern harrier is a ground nester in prairies and marshes among low shrubby vegetation and tall weeds or reeds. Nesting is usually restricted to relatively large, at least 60 hectares (148 acres), undisturbed sites (Herkert 1992). Northern Harriers are predators that hunt above fields, short grass, pastures, and other open country types. Prey is usually taken on ground and consists of small mammals, birds, frogs, small reptiles, crustaceans, and insects. Northern harriers roost

communally but birds may fly as far as 8 kilometers (5 miles) from roost to separate hunting ranges and each bird may have several hunting areas within its daily range. Harriers fly for long periods in an unhurried combination of flapping and gliding, but do not fly in wet weather (INHS 2000).

The northern harrier was observed at marshes adjacent to the west side of Beardstown, though it is likely this bird was a non-breeding transient. The northern harrier was also observed during a spring survey at the west side of BNSF railroad tracks south of Beardstown. The individual was possibly breeding. The proposed alternatives will not affect this area; therefore, the northern harrier will not be impacted.

- **Least bittern (*Ixobrychus exilis*)** (state threatened). **This** shy, secretive bird usually nests singly, preferring dense growth of marsh emergents (cattails, sedges, smartweed, and buttonbush), particularly when close to open water. The bird hides in tall vegetation, feeds at the waters edge, and retreats into vegetation after capturing prey. The least bittern primarily feeds on fish, but also eats insects, aquatic bugs, crustaceans, amphibians, leeches, slugs, and occasionally shrews and mice. The home range has been estimated as 1 hectare (2.5 acres) surrounding the nest.

The least bittern was heard responding to taped playback in portions of the Beardstown Marsh (east of U.S. 67). This individual was likely breeding, though these occurrences are not proximate to proposed road improvements. The least bittern would not be impacted as a result of road improvements.

- **Pied-billed grebe (*Podilymbus podiceps*)** (state threatened). The pied-billed grebe is most commonly found on freshwater ponds, streams, rivers, lakes, and marshes with emergent water plants. The grebe is also found on saltwater bays and estuaries. The grebe prefers ponds less than 7 hectares (17 acres), especially with dense stands of emergent vegetation. The species nests in fairly shallow water, usually near to open water. The nest is a platform of floating vegetation (flags, rushes, sedges, and mud), that is often attached to grasses, reeds, bushes, or anchored to the bottom.

The pied-billed grebe commonly dives for food and mainly feeds on insects (nymphs of dragonflies and damselflies, diving beetles, wasps, bees, and ants), fish (carp, catfish, eels, roach, sticklebacks, sculpins, silversides, and top minnows), crayfish, and, to a lesser extent, snails, spiders, frogs, and tadpoles. The birds will also eat some seeds and soft parts of aquatic plants.

The pied-billed grebe rarely flies and escapes by diving with a short leap or slowly submerging. The pied-billed grebe is the most solitary of the grebes. It is also the first grebe to arrive north in the spring and the last to leave in the fall. Grebes migrate in closely-massed flocks.

Six pied-billed grebes were observed in the course of avian surveys in marshes immediately southwest of Beardstown, west of U.S. 67. These individuals were assumed to be non-breeding migrants. Pied-billed grebes were also observed adjacent to Mauvaise Terre Creek north of U.S. 67. These birds were assumed to be non-breeding. Because pied-billed grebes are not breeding within the project area, the proposed road improvements would have no impact on this species.

- **Common Moorhen (*Gallinula chloropus*)** (state threatened). The common moorhen sporadically occupies large marsh complexes in Illinois (Herkert 1991). Common moorhens have been observed breeding in the Beardstown Marsh in the past decade. The common moorhen was not observed in the course of avian field surveys. It is assumed that the common moorhen does not currently breed in the project area and that the proposed road improvements would not impact this species.

Reptile and Amphibian Species.

- **Illinois Mud Turtle (*Kinosternon flavescens spooneri*)** (state endangered). The Illinois mud turtle is typically found in temporary to permanent ponds and backwaters associated with sand prairies and other sandy habitats in the Illinois, Mississippi, and Green River drainage systems. The Illinois mud turtle can potentially occur in many sandy, ephemeral depressions on the ancient Illinois River floodplain south of Beardstown. The species spends most of the year in sand burrows, moving to aquatic habitats for a few weeks in spring to early summer and again in the fall. Radio tagging studies of Illinois populations showed that mud turtles rarely move more than 200 meters (656 feet) from pond edges (Herkert 1992). The turtle's omnivorous diet consists of snails, insects, worms, tadpoles, fish, and aquatic plants. Predators include hognose snakes, raccoons, foxes, and coyotes.

Three Illinois mud turtles were observed within sandy depressions in the abandoned Sanitary Landfill adjacent to the BNSF railroad tracks. **The proposed road improvements would have no impact on this species.**

- **Illinois Chorus Frog (*Pseudacris streckeri illinoensis*)** (state threatened). In Illinois, the Illinois chorus frog originally inhabited sand prairies, but because this habitat has been largely eliminated, these frogs have adapted somewhat to agricultural fields and waste areas where sand prairies were once common. The species is restricted to sand substrates where it burrows underground and emerges after heavy, early spring rain to breed in nearby flooded fields, ditches, and other vernal ponds. The frogs diet consists of small insects that can **be captured and eaten** underground.

The Illinois chorus frog was observed at many locations within the project area during the course of amphibian and reptile field surveys. Based on auditory

surveys, the INHS estimates a population of over 300 Illinois chorus frogs (total) in 11 individual basins. All locations are within the sandy habitat between the Arenzville Bluffs and Beardstown. In addition to recent INHS discoveries, historical records document the occurrence of the Illinois chorus frog in many other sandy ephemerally inundated depressions between Beardstown and Arenzville. It is evident that the Illinois chorus frog could occur in most temporarily inundated sandy depressions within the broad ancient floodplain of the Illinois River, south of Beardstown. Table 2-34 summarizes occurrences of the Illinois chorus frog in the vicinity of the project area.

TABLE 2-34

Summary of Occurrences of the Illinois Chorus Frog in the Project Area

Site	Comments
4.5 km (2.8 mi) N. of Cass/ Morgan County line	10-15 individuals
St. Peters Church Rd.	20-25 individuals
Honey Point Rd.	10-15 individuals
0.4 km (0.2 mi) E. of Hagener Rd.	10-20 individuals
Hagener Rd.	1 individual
Sanitary Landfill south of Beardstown (T45N R10E SE/4 Sect. 31	40-50 individuals
Sixth Street/ Beardstown	>100 individuals
Greater Beardstown Airport (T17N R 12W SE/4 SW/4 NE/4 Sect. 2	>100 individuals
North of Subway Restaurant in Beardstown	Heard calls, numbers unknown
Flooded field in center of section 21, T18N R12W	Heard calls, numbers unknown
Pond 0.2 km (0.1 mi) east of Hackman Cemetery (north of St. Peter's Lutheran Church), T17N R12W Sect 25 NE SW NE	Heard calls, numbers unknown

Terrestrial Invertebrate Species.

- **Ottoe skipper (*Hesperia ottoe*)** (state threatened). The ottoe skipper habitat is native prairie. The adult species feeds on nectar from flowers of green and common milkweeds, yellow prickly pear, vetch, alfalfa, bush houstonia, purple coneflower, leadplant, compass plant, sunflower, and blazing star (USGS 2000).

In Illinois, the ottoe skipper is primarily restricted to sandy hill prairies along the Illinois River in west-central Illinois, although a population also occurs in the northern part of the state (Herkert 1992). The ottoe skipper occurs in Illinois on sandy areas, including sand prairies, dunes, and loess hill prairies, and feeds on blazing star, pearly everlasting, and purple coneflower. The

species is apparently dependent on large, open, relatively undisturbed sand-prairie habitat. The larval food plant in Illinois is not known, but is suspected to be little bluestem (Herkert 1992).

Within the project area, the ottoe skipper has historically been observed at the Northeast Meredosia Hill Prairie Nature Preserve. During terrestrial invertebrate surveys, several ottoe skippers, including a breeding pair, were observed on a hill prairie near the Northeast Meredosia Hill Prairie Nature Preserve. Other suitable habitat containing known nectaring and larval host plant species was observed in the Arenzville Bluffs area, but no ottoe skipper individuals were observed in these areas. **The proposed road improvements would have no impact on this species.**

- **Regal fritillary (*Speyeria idalia*)** (state threatened). The regal fritillary habitat across North America is native tall-grass prairie and other open sites including damp meadows, marshes, wet fields, and mountain pastures. The adult species feeds on nectar from flowers of milkweeds, thistles, red clover, and mountain mint (USGS 2000). The species has habitat affinities of sand dune woodland-prairie savanna complexes and marsh areas in sandy regions, and less commonly, dry, upland prairie hillsides near streams.

In Illinois, the regal fritillary is primarily restricted to the northern part of the state and it was reported to occur in 29 counties (USGS 2000). However, the species may now only occur in seven Illinois counties, with six or fewer healthy reproducing populations that are small and isolated, thus making them vulnerable to population collapse.

During field surveys, the regal fritillary was observed at several locations in the vicinity of the Sanitary Landfill. Several loess hill prairies in the Arenzville Bluffs area were noted as potential nectaring and/or breeding sites for the regal fritillary but individuals were not observed there in the course of terrestrial invertebrate surveys.

Plant Species.

- **Patterson bindweed (*Stylisma pickeringii* var. *pattersonii*)** (state endangered). Patterson bindweed is found in south-central United States, reaching its northwestern limit in central Illinois. Four populations are known in three Illinois counties, but recent surveys in Cass and Morgan counties suggest that other populations may persist in the sand areas of the Illinois and Mississippi rivers (Herkert 1991).

Populations of the Patterson bindweed in Illinois are small and declining. Only two single Patterson bindweed plants are known to occur in Cass County; the species is in danger of extirpation in the area. During field surveys, a single small plant was found at the Boulevard Road Sand Prairie and Sand Pond. This site is a former sand prairie and sand savanna site that has good diversity

and characteristic sand prairie species, despite the fact that portions are used as a Christmas tree farm. Previously there had been a larger population at this site, but the area was cleared for housing and it appears that all of the plants except one were destroyed. The continued existence of Patterson bindweed within the project area is bleak as a result of encroaching development.

- **Pink milkwort (*Polygala incarnata*)** (state endangered). The pink milkwort ranges from central and eastern United States to southern Ontario. In Illinois, the species is found in sand prairies, hill prairies, and barrens in scattered localities throughout the state. Pink milkwort is presently known from six Illinois locations, one in the Northeast Meredosia Hill Prairie Nature Area, another in Shawnee National Forest, and the remainder on private land (Hill 1997). These populations occur in seven Illinois counties (Herkert 1991).

The occurrence of the pink milkwort at Northeast Meredosia Hill Prairie Natural Area was discovered by Evers (1955); however, it was not relocated within the project area despite considerable recent floristic work by INHS. Several loess hill prairies within the Arenzville Bluffs area are noted to provide suitable habitat for the pink milkwort; however, this species was not observed in the course of floristic work. The proposed road improvements would have no impact on this species.

- **American burnet (*Sanguisorba canadensis*)** (state endangered). The American burnet ranges from boreal eastern Canada south into northeastern United States and the Appalachians. The species reaches its southwestern range limit in Illinois on wet-mesic calcareous prairies along the Illinois and Des Plaines Rivers (Herkert 1991).

American burnet is known from three populations in Illinois, two in Will County and one in Cass County (Herkert 1991). The Cass County population is in the Beardstown Railroad Prairie Natural Area. Records indicate that it has been known from this site since the mid 1800s, but it is nearly gone from this site today. The population consists of only three clumps of plants that are endangered by mowing and herbicides. This population of American burnet is not proximate to proposed road improvements; therefore, this species would not be impacted.

- **Vahl's fimbristylis (*Fimbristylis vahlii*)** (state endangered). Vahl's fimbristylis is primarily found in southeastern United States and tropical America, with some disjunct populations in central Illinois. The species reaches its northern range limit in Illinois on a small part of the Illinois River Sand Areas Section. Two populations are known from Illinois, both occurring in wet sandy depressions on private land in Cass County (Herkert 1991). One population is within the Wal-Mart sand pond and consists of greater than 1,000 individuals. The other population is within the Beardstown Fimbristylis Site Natural Area

and consists of only a few individuals. **The proposed road improvements would have no impact on this species.**

- **Small burhead (*Echinodorus tenellus*)** (state endangered). The small burhead is primarily a wetland species of the southeastern United States reaching its northernmost range in western Illinois (Herkert 1991). Two element occurrences of the small burhead are known from Illinois, both in sandy margins of ponds. The only known occurrence of the small burhead in the vicinity of the project area is in Site 6, the Hagener Sand Pond Natural Area, in which many thousand individual plants have been observed in a given year. This population of the small burhead is not proximate to proposed alternatives; therefore, this species would not be impacted as a result of road improvements.
- **Hall's bulrush (*Scirpus hallii*)** (state threatened). Hall's bulrush is found in widely disjunct localities in eastern United States and the Midwest (Herkert 1991). Habitat destruction has played a major role in the disappearance of Hall's bulrush. Ponds and sloughs have been drained for agricultural use and many sand areas are being plowed or altered by conversion into pine tree plantations, road construction, and overgrazing (Herkert 1992). The species is presently known from eight states, six with only one population (Herkert 1991).

In Illinois, Hall's bulrush is primarily found in association with sand ponds. During drought years it often does not germinate at all. During very wet years it can be locally common. Hall's bulrush has been found in 27 populations in Illinois, 12 of which are in Cass County. The remaining populations are in Mason County (13 populations), Kankakee County (one population), and Morgan County (one population). Table 2-35 summarizes occurrences of Hall's bulrush in the vicinity of the project area based on intensive floristic field studies.

TABLE 2-35

Summary of Occurrences of Hall's Bulrush in the Project Area

Site	Comments
Site 5: Sanitary Landfill Sand Pond	Common
Site 6: Hagener Sand Pond Natural Area	Occasional
Site 12: Bulrush Sand Pond Natural Area	Occasional to common (~1,000 plants)
Site 13: Boulevard Road Sand Prairie and Sand Pond	Rare to occasional (Several plants)
Site 19: Beardstown Fimbristylis Site Natural Area	Occasional
Site 20: Sand Pond and Marsh South of Indian Creek	Occasional
T 17N R 12W SE/4 SW/4 SE/4 Sect. 2	Occasional

- **Hill's thistle (*Cirsium hillii*)** (state threatened). Hill's thistle occurs from southern Ontario to Pennsylvania, west to Minnesota and South Dakota. Hill's thistle was historically widespread in dry prairie habitat in the northern two-thirds of Illinois but has shown a substantial decline. The species is now known to occur in less than half of all counties with historic records, at an estimated 20 locations in seven Illinois counties. Hill's thistle has affinities for loess hill prairies. Table 2-36 summarizes occurrences of Hill's thistle in the vicinity of the project area based on intensive floristic studies.

Hill's thistle occupies open areas of hill prairies near the bluff tops. Small areas of loess hill prairie potentially impacted as a result of proposed road improvements would impact only a small portion of the hill prairie near the shrubby base of the bluffs. Therefore, proposed improvements would not impact Hill's thistle.

TABLE 2-36

Summary of Occurrences of Hill's Thistle in the Project Area

Site	Comments	Site	Comments
Site 7: Mud Creek Loess Hill Prairie	Rare (10 plants)	Site 2: Loess Hill Prairie	Occasional (50 plants)
Site 21: Northeast Meredosia Hill Prairie Natural Area	Rare	Site 3a : Loess Hill Prairie	Occasional to common (300 plants)
Site 23: Loess Hill Prairie	Occasional (200 plants)	Site 3b: Loess Hill Prairie	Occasional (40 plants)
Site 1: Mud Creek Loess Hill Prairie	Occasional (100 plants)	Site 4: Loess Hill Prairie	Occasional to common (64 plants)
Site 1A: Loess Hill Prairie	Common (500-1,000 plants)	Site 3C: Loess Hill Prairie	Occasional (100 plants)
Site 1B: Loess Hill Prairie	Rare to occasional (5 plants)		

- **Pale false foxglove (*Agalinis skinneriana*)** (state threatened). Pale false foxglove occurs from southwestern Ontario to Ohio, Wisconsin, Missouri, and Kansas. In Illinois, this species is apparently restricted to loess hill prairies and sand prairies. Pale false foxglove is known to exist today in eight Illinois counties: Greene, Jersey, Lake, Cass, Mason, Menard, Morgan, and Pike (Hill 1997). Table 2-37 summarizes occurrences of the pale false foxglove in the

vicinity of the project area based on intensive floristic studies. **The proposed road improvements would have no impact on this species.**

TABLE 2-37

Summary of Occurrences of the Pale False Foxglove in the Project Area

Site	Comments	Site	Comments
Site 21: Northeast Meredosia Hill Prairie natural Area	Rare to occasional	Site 1A : Loess Hill Prairie	Rare (3 plants)
Site 23: Loess Hill Prairie	Occasional (200 plants)	Site 7: Loess Hill Prairie	Reported by Evers (1955), not relocated by Hill despite considerable effort
Site 1: Mud Creek Loess Hill Prairie	Rare to occasional (60 plants)		

- Umbrella sedge (*Cyperus grayioides*)** (state threatened). Umbrella sedge is found in Louisiana, Texas, and northwestern and central Illinois. In Illinois, umbrella sedge is restricted to blowout disturbances in dry sand prairies of the Illinois River and Mississippi River Sand Areas Natural Division. Thirteen populations occur in Jo Daviess, Whiteside, Carroll, Mason, and Cass Counties; population sizes vary greatly between different sites in relation to the extent of suitable blowout habitat. One site is on federal property, four are managed on public land, and the rest occur on private property (Herkert 1991). Two sites are known within the project area to provide refuge for the umbrella sedge; the Excel Sand Prairie and Botanical Site #2 -Xeric sand prairie. The umbrella sedge is occasional to common on the Excel Sand Prairie and rare on Botanical Site #2. These two populations are not proximate to proposed road improvements for either alternative; therefore, this species would not be impacted.

2.3.5.5 Illinois Natural Areas

Illinois Natural Areas are those remnants that have been designated throughout the State of Illinois during the Illinois Natural Areas Inventory (INAI) surveys. The methodology used to designate a remnant as an Illinois Natural Area is described in White (1978). The first statewide INAI was completed in 1978 and revisions are ongoing. The INAI is maintained by IDNR. Nine designated Illinois Natural Areas have been inventoried on INAI within the project area (Table 2-38). Seven of the Illinois Natural Areas are privately-owned and two are publicly-owned.

TABLE 2-38

Illinois Natural Areas Inventoried within the Project Area

Natural Area	Plant Community Type	Comment	Size	Ownership
Beardstown Fimbristylis Site	Sand pond	Large population of <i>Fimbristylis vahlii</i> (state endangered).	0.3 (0.7)	Private/ Public ROW
Beardstown Marsh Natural Area	Emergent marsh	Diverse wetland complex. Several state threatened and endangered species.	189 (468)	Private
Beardstown Railroad Prairie	Xeric sand prairie	Notable xeric sand prairie with several state listed species recorded.	1.2 (3.0)	Private (BNSF railroad)
Meredosia Refuge	Complex of floodplain forest, permanent marsh, seasonal wetlands, and upland communities	Discussed in next sub-section.	2,322 (5,737)	Public
Bulrush Sand Pond	Sand Pond	Sand pond with associated sand prairie. Large population of state endangered <i>Scirpus hallii</i> . Other state listed species.	6 (15)	Private
Hagener Sand Pond	Sand Pond	Sand pond known to contain three state endangered species (<i>Echinodorus tenellus</i> , <i>Scirpus hallii</i> , and the Illinois Chorus Frog).	0.4 (1.1)	Private
Northeast Meredosia Hill Prairie	Loess Hill prairie	Discussed in next sub-section.	16 (39)	Public
Newman Cemetery Savanna	Dry-mesic savanna	The only dry-mesic savanna community known within Morgan County.	1.3 (3.2)	Private
Mud Creek Loess Hill Prairie Natural Area *	Loess Hill Prairie	INAI Category II loess hill prairie that is known breeding habitat for the <i>Hesperia ottoe</i> . The site is also known to contain <i>Agalinis skinneriana</i> and <i>Cirsium hillii</i> .	4 (10)	Private

* INAI site number has not been assigned.

2.3.5.6 Illinois Nature Preserves

Areas designated as Illinois Nature Preserves are those dedicated remnants of natural habitat included in *The Directory of Illinois Nature Preserves, Volumes 1 and 2* (McFall and Karnes 1995) with ongoing revisions. Remnants dedicated as Illinois Nature Preserves are afforded the highest protection against future changes in land use by language in The Illinois Natural Areas Preservation Act. Generally, Illinois Nature Preserves are high-quality plant communities with a high degree of natural integrity and the potential to provide refuge for threatened and endangered species. There is one dedicated Illinois Nature Preserve within the project area, the Meredosia Hill Prairie Nature Preserve. The Meredosia Hill Prairie Nature Preserve is located along Meredosia-Arenzville Road east of

existing U.S. 67 (Figure 2-1). The site is 15 hectares (37 acres) in size and is owned by the IDNR. A portion of this preserve is identified by the INAI as Grade B loess hill prairie. This site remains as one of the least disturbed examples of loess hill prairie extant within the Glaciated Section of the Middle Mississippi Border Natural Division. The vegetation is typical of loess hill prairies: sideoats grama, little bluestem, and silky aster are predominant plant species.

2.3.5.7 National Wildlife Refuges and Fish and Wildlife Areas

The objectives of the National Wildlife Refuge (NWR) system are to accommodate habitat needs for wildlife while maintaining public opportunities for outdoor recreation and education. There is one area administered by the USFWS in the vicinity of the U.S. 67 project area, the Meredosia NWR. An additional area, owned, and operated by the IDNR, is the Sanganois Fish and Wildlife Area.

The Meredosia NWR, owned by the USFWS, is located along the Illinois River, just north of Meredosia, from river mile 71.5 to 76.7 (Figure 2-1). When complete, the Meredosia NWR will be 2,127 hectares (5,255 acres). The Meredosia refuge is part of a four-refuge corridor that extends along 200 kilometers (125 miles) of Illinois River.

The Sanganois Fish and Wildlife Area (3,800 hectares, or 9,390 acres) is located on the Illinois River north of Beardstown. Predominant activities include duck and waterfowl hunting; however, many other game species are also hunted.

2.4 Air Quality

The USEPA is responsible for adopting the National Ambient Air Quality Standards (NAAQS) for certain pollutants. The NAAQS establish maximum pollutant concentration limits for six criteria pollutants. The pollutants and the respective standards are listed in Table 2-39. The primary standards are established at levels intended to protect the public health. Secondary standards are intended to protect public welfare and are based on a pollutant's effect on vegetation and other materials.

Ambient air quality is monitored at locations throughout the state. The entire state of Illinois is considered an attainment area for the pollutants carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. Certain areas of the state do not attain the NAAQS for ozone and particulates (PM₁₀). There are two non-attainment areas for the 1-hour ozone standard: Chicago and Metro-East St. Louis. The two areas in Illinois that do not attain the PM₁₀ standard (non-transportation related) are Lake Calumet and McCook.

The nearest monitoring location to the project is in Quincy, in Adams County. The monitoring station reports on PM_{2.5}, sulfur dioxide (SO₂), and ozone (O₃). There have been no exceedance days **in 2000** at the Quincy Monitoring Site for any of these criteria pollutants. The project is located in an area that is classified as attainment for all criteria pollutants.

TABLE 2-39
Summary of National and State Ambient Air Quality Standards

Pollutant	Averaging Time	Primary	Secondary
Particulate Matter			
10 micrometers (PM ₁₀) (PM _{2.5}) ^b	Annual Arithmetic Mean	50 µg/m ³	Same as Primary
	24-hour	150 µg/m ³	Same as Primary
	Annual Arithmetic Mean	15 µg/m ³	Same as Primary
	24-hour	65 µg/m ³	Same as Primary
Sulfur Dioxide (SO ₂)	Annual Arithmetic Mean	0.03 ppm (80 µg/m ³)	None
	24-hour	0.14 ppm (365 µg/m ³)	None
	3-Hour	None	0.5 ppm
Carbon Monoxide (CO)	8-Hour	9 ppm (10 µg/m ³)	Same as Primary
	1-Hour	35 ppm (40 µg/m ³)	Same as Primary
Ozone (O ₃)	1-Hour/Day ^a	0.12 ppm (235 µg/m ³)	Same as Primary
	8-Hour/Day ^b	0.08 ppm	Same as Primary
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	0.053 ppm	Same as Primary
Lead (Pb)	Quarterly Arithmetic Mean	1.5 µg/m ³	Same as Primary

Note: All standards with averaging times of 24 hours or less are not to have more than one actual or expected exceedance per year.

^a The 1-hour ozone standard pertains only to Cook, DuPage, Kane, Lake, McHenry, and Will Counties, and Aux Sable and Goose Lake Townships in Grundy County, and Oswego Township in Kendall County in the Chicago area; and to Madison, Monroe, and St. Clair Counties in the Metro-East St. Louis area.

^b The ozone 8-hour standard and the PM_{2.5} standards are included for information only. These standards were proposed by USEPA in 1997 and have been subject of litigation. The U.S. Supreme Court issued a ruling upholding the standards on February 27, 2001. However, that ruling found USEPA's implementation policy unlawful and remanded the case to USEPA to develop a reasonable interpretation of the nonattainment implementation provisions insofar as they apply to revised ozone NAAQS.

The **Air Quality Index (AQI)** is the current national standard method for reporting air pollution levels to the general public. The AQI is based on the short-term Federal National Ambient Air Quality Standards (NAAQS), the Federal episode criteria, and the Federal Significant Harm levels for five of the “criteria pollutants,” namely, ground-level Ozone (O₃), Sulfur Dioxide (SO₂), Carbon Monoxide (CO), Particulate Matter (PM), and Nitrogen Dioxide (NO₂). The AQI levels have been divided into six categories: “Good” (0-50), “Moderate” (51-100), “Unhealthy for Sensitive Groups” (101-150), “Unhealthy” (151-200), “Very Unhealthy” (201-300), and “Hazardous” (301-500).

AQI classifications of “Unhealthy for Sensitive Groups” and “Unhealthy” are uncommon in Illinois. Classifications of “Very Unhealthy” are rare. To date, no classifications of “Hazardous” have occurred in Illinois.

2.5 Noise

Noise in the project area is caused by a number of sources, including highway and local road traffic, farm machinery, local industry, and various components of the project-area communities. Noise levels are influenced by wind and the extent to which people are shielded from noise by buildings, natural buffers, or terrain.

The noise analysis determines existing noise levels at sensitive receptor locations along the project corridor alternatives, and predicts noise levels at these same locations for the design year (2030) with and without construction of the expressway. According to 23 CFR 772, traffic noise impacts occur when the predicted traffic noise levels approach or exceed the FHWA Noise Abatement Criteria (NAC), or when the predicted noise levels substantially exceed the existing noise levels. In Illinois, traffic noise impacts are defined to occur when design year traffic levels approach or exceed the NAC; or design year traffic noise levels are greater than 14 dBA above existing traffic-generated noise levels.⁸

Noise analyses were performed for eight receptors located along the alternative alignments. Receptor descriptions are given in Table 2-40 and receptor locations are shown on Figures 2-1, 2-2, and 2-3 (Environmental Inventory Exhibit). Peak hour traffic volumes were used in calculating traffic noise levels at each receptor in order to simulate the worst hourly traffic-generated noise impacts. The NAC for all of the receptors in this corridor is 67 dBA. Existing noise levels meet the maximum NAC for residential property (67 dBA) at Receptor 1 (which represents nine homes near Marnico Lane).

TABLE 2-40
Noise Model Receptor Locations

Receptor No.	Type	Represents	Existing Noise Levels
-----------------	------	------------	--------------------------

⁸ Approach is defined as: Design-year noise levels equal or exceed 1 dBA less than the NAC

TABLE 2-40
Noise Model Receptor Locations

Receptor No.	Type	Represents	Existing Noise Levels
R-1	Residence	9 homes between Marnico Ln. and the existing U.S. 67. The outside activity areas are about 17 meters (55 feet) north of the U.S. 67 centerline.	67
R-2	Residence	Typical farmstead (near Chapin) located about 48 meters (158 feet) south of the existing U.S. 67 centerline and across from the Field Rd. intersection with U.S. 67.	58
R-3	Residence	Typical farmstead (near Beardstown) situated southwest of the intersection of Meredosia Rd. and U.S. 67. Its distance from the existing U.S. 67 centerline is about 47 meters.	58
R-4	Residence	10 homes (in Concord). The receptor is a residence on Morgan St. in Concord. This is the closest home to the proposed U.S. 67 Alt. A. The home is about 20 meters (65 feet) west of the proposed U.S. 67 right-of-way.	45 *
R-5	School	Triopia School playing field about 485 meters (1,590 feet) west of the proposed U.S. 67 Alternative A.	44
R-6	Residence	Typical farmstead (near Rushville) located northwest of the intersection of U.S. 67 and Mourning Ln. The existing U.S. 67 centerline is at a distance of about 67 meters (220 feet) east of the site.	55
R-7	Residence	Typical farmstead (near Industry) about 95 meters (310 feet) east of the existing U.S. 67 centerline.	52
R-8	Church	Church located northwest of the U.S. 67 and Camp Creek Rd. intersection. The distance from this site to the existing U.S. 67 centerline is approximately 58 meters (190 feet).	56

* In the absence of a major roadway, noise levels at R4 are estimated based on background noise levels in similar settings.

Shaded cells indicate receptor locations at which traffic noise levels approach or exceed the FHWA NAC.

2.6 Cultural Resources

Pursuant to the National Historic Preservation Act of 1966, as amended, cultural resources studies were conducted in the corridor for proposed FAP 310 (U.S. 67). These studies, conducted in consultation with the Illinois State Historic Preservation Officer (SHPO), were designed to identify the types of cultural resources present in the study area and to produce data to allow a determination of their eligibility for the National Register of Historic Places and to aid in the formulation of any necessary mitigation measures (**see Appendix H**). Pedestrian archaeological and architectural surveys were undertaken by professional personnel under contract to IDOT in the 4,452 hectares (11,000 acres) contained within the FAP 310 corridor. Illinois SHPO staff reviewed results of these studies, and their recommendations were applied to the findings outlined below.

The project corridor consists of a brief stretch of Illinois River floodplain and large sections within the flat to slightly rolling Galesburg and Springfield Till Plains. The corridor yielded evidence of initial occupation by human groups during the Early Holocene Period beginning some 10,000 years ago. The broad till plains were blanketed by an initial

Holocene temperate forest consisting largely of elm, oak, and hickory. During this period, mobile residential campsites of these hunter-gatherers were established on high ground in the Illinois Valley and along its tributary streams, while hunting stations were occupied along minor streams and on drainage divides. As the climate became warmer and more arid beginning some 8,000 years ago, prairies expanded as forested areas declined. After this Middle Holocene period, the study area consisted largely of open prairies broken by ribbons of forested streams. Prehistoric settlement of Late Holocene (modern climates and vegetation – 5,000 years ago) Illinois upland prairies, like those found in the corridor, were used by small mobile work parties in hunting and gathering activities. Villages and associated cemeteries, including earthen mounds, were established in and along the Illinois Valley.

Of some 300 archaeological sites found in the project corridor, 60 percent were small surface scatters of prehistoric lithic materials or recent historic debris. Several cemeteries, both historic and prehistoric, including four mound groups, were identified. The prairies and bottomlands contained within the corridor were settled by Euro-Americans during the early 19th century. The economy of the corridor region is overwhelmingly agrarian, and the architecture recorded during the inventory reflects this observation. No historical properties within the corridor are currently listed on the National Register. Of the 167 standing structures/structure complexes over 50 years old located within the corridor, the vast majority are buildings associated with farming activities. Also found within the corridor were buildings such as service stations that were associated with U.S. 67, and also several small, rural schools.

2.7 Special Waste

2.7.1 Hazardous Waste

The USEPA listing of potential, suspected, and known hazardous waste or hazardous substance sites in Illinois (i.e., the Comprehensive Environmental Response Compensation and Liability Information System [CERCLIS] list) was reviewed to ascertain whether the project will involve any listed site(s). As a result of this review, it was determined that none of the project alternatives would require any right-of-way or easement from any site included in the CERCLIS listing as of **April 24, 2002** (USEPA 2002).

2.7.2 Non-Hazardous Waste

A PESA was conducted by the ISGS to assess the project area for hazardous wastes (July 1996 and August 1997). **The PESA for the subject project was completed on October 17, 1997. Standards issued by the American Society for Testing and Materials (ASTM) indicate that property audits for special waste/regulated substance contamination should only be considered valid for a period of six months. Per the BDE Manual, Chapter 27, Section 2.07, the district has reevaluated the project area.**

It has been determined that it is not necessary to complete a supplement PESA for the subject project. This determination was based upon review of the existing land use throughout the proposed corridor. In addition, the EPA CERCLIS Hazardous Waste Site list (updated March 19, 2002) and the IEPA LUST Site list (updated April 19, 2002) were reviewed to determine the presence of any new sites within the project corridor. This search did not uncover any new sites or significant land use changes within the project corridor; therefore, the PESA dated October 17, 1997, is revalidated effective April 24, 2002 (Appendix G).

In the Interim Report, ISGS identified 62 sites with potential hazardous waste concerns based on historical research and visual inspection in the project area. Of those 62 sites, 38 were subject to further investigations due to the high probability of requiring right-of-way from those parcels. However, as the alignments were refined throughout the study, several of these sites are not near alignment alternatives retained for detailed study (sites 9-14; 21-24; and site 27). Therefore, no additional investigation will be conducted at these sites. Table 2-41 summarizes areas of potential concern. Locations of these sites are shown in Figures 2-1, 2-2, and 2-3. Results of the investigations of the sites are discussed in Section 4.

TABLE 2-41

Hazardous and Non-Hazardous Special Waste Sites of Concern

ISGS No.	Facility Type	Facility Name	Location
1	Possible UST	Smith Airport	SWC of U.S. 67 and US 136
2	UST/ Commercial	Sullivan Brothers Fertilizer Co	NEC of U.S. 67 and TR 950N
3	Possible UST	Old Dutch Mill Gas Station	West side of U.S. 67, 0.8 km (0.5 mi) north of West St.
4	Possible agrichemical site	Unnamed	North side of South St. approximately 0.4 km (0.2 mi) west of First St.
5	Possible UST site	Former gasoline station/Bedwell Farm	NWC of U.S. 67 and Doddsville Rd.
6	Possible UST site	Former gasoline station/Greer Farm	NEC of U.S. 67 and IL 101
7	UST site	Former Log Cabin gasoline station	NEC of U.S. 67 and Log Cabin Rd.
8	Pipeline site	Amoco Oil Co	On U.S. 67 approximately 1.5 km (0.9 mi) north of Camden-Frederick/Tullis Rd.
9	UST site	Wilson Veterinary Clinic	NWC of U.S. 67 and Camden-Frederick/Tullis Rd.
10	Commercial site	Roger Spiller's Trucking	SWC of US 24 and Vermont Rd.
11	Possible UST site	Former gasoline station	East side of US 24 approximately 0.1 km (0.06 mi) north of Dump Rd.
12	Commercial site	Jim Sullivan Auto Repair	SWC of U.S. 67 and County Farm Rd.

TABLE 2-41
Hazardous and Non-Hazardous Special Waste Sites of Concern

ISGS No.	Facility Type	Facility Name	Location
13	UST site	Shell gasoline station	NWC of U.S. 67 and US 24
14	Possible UST site	Rushville Hardee's restaurant	SEC of U.S. 67 and US 24
15	Possible UST site	Former gasoline station	East side of US 24 approximately 0.2 km (0.1 mi) south of Ross Rd.
16	AST site	Midland Minerals tank battery	North side of Parkview Rd. East approximately 175 m (574 ft) west of the intersection of Parkview Rd. South and Parkview Rd. East
17	AST site	Precision Production tank battery	North side of Parkview Rd. East approximately 0.7 km (0.4 mi) west of the intersection of Parkview Rd. South and Parkview Rd. East
18	AST site	Unnamed tank battery	North side of Parkview Rd. East approximately 0.8 km (0.5 mi) west of the intersection of Parkview Rd. South and Parkview Rd. East
19	AST site	Former tank battery/Pfieffer Est	NEC of intersection of U.S. 67 and Pfieffer Rd.
20	AST site	Oil wells and tank battery/Pfieffer Est.	SWC of intersection of U.S. 67 and Pfieffer Rd.
21	Possible UST site	Video City	NWC of U.S. 67, IL 125 and Grand Ave.
22	Possible UST site	Beardstown Hardee's restaurant	SWC of U.S. 67, IL 125 and Grand Ave.
23	Possible UST site	Helig Meyers	NEC of U.S. 67, IL 125 and Grand Ave.
24	UST site	Green Oil Unocal	SEC of U.S. 67, IL 125 and Grand Ave.
25	UST site	Beardstown Township	SWC of Upper Meredosia Rd. and U.S. 67
26	Pipeline site	Williams Pipeline	Intersects proposed corridor about 0.7 km (0.4 mi) south of St. Peter Lutheran Church Rd.
27	Possible PCB site	Transformers	South side of Woodward Cemetery Rd. about 0.6 km (0.4 mi) east of Arenzville-Concord Rd.
28	Commercial site	Jake's Place	East side of U.S. 67 approximately 0.8 km (0.5 mi) north of Hagener/Lock Rd.
29	Former commercial site	Former Blacksmith shop	Northeast side of U.S. 67 and Hagener/Lock Rd.
30	Possible PCB site	Electrical substation	NWC of U.S. 67 and Hagener/Lock Rd.
31	UST site	Lovekamp Farm	West side of U.S. 67 approximately 1.3 km (0.8 mi) south of the Cass-Morgan county line
32	Pipeline site	Williams Pipeline	Intersects the project route north of IL 104 junction
33	Possible UST site	Former gasoline station	Along the south side of U.S. 67 approximately 0.15 km (0.1 mi) west of Bethel Rd.

TABLE 2-41

Hazardous and Non-Hazardous Special Waste Sites of Concern

ISGS No.	Facility Type	Facility Name	Location
34	Agrichemical/ AST site	Morgan County Service	SEC of U.S. 67 and Bethel Rd.
35	Former UST site	Former Amoco Station	NWC of U.S. 67 and Ash St.
36	UST site	Bearcat Junction	SEC of U.S. 67 and Cooper St.
37	Possible UST site	Former bulk plant	SEC of U.S. 67 and BNSF Railroad tracks
38	UST site	French/Wilson Farm	NEC of U.S. 67 and BNSF Railroad tracks